

Great Lakes Protection Fund
APPLICANT COVER SHEET



PROPOSAL# _____

(Internal use only)

PROJECT RESPONSIBILITY

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Organization Description: Non-profit University Government Agency Other

SUPPORT REQUESTED

Amount Requested (U.S. \$): \$249,000

Project Duration (Months): 9 to 12 months

Type of Support (Grant, Loan, Equity, etc.): Grant

The Fund may share this preproposal with other funders and organizations: Yes No

PROJECT SUMMARY

Project Title: Optimizing Industry Water Use - Phase II, Effective Application of Water Footprinting Methodologies to Industrial Operations in the Great Lakes Basin

Narrative Summary: *Briefly(2-3 sentences) describe the actions your proposed project will take to improve the health of the Great Lakes ecosystem.*

This phase of project #926 will apply the use of water footprinting tools to industrial water use at pilot facilities located within the Great Lakes Basin to assess their utility and effectiveness in advancing the sustainability of the Region's water resources. The results of this project will be of value to Great Lakes State and Provincial water resource managers, resource protection policy decision makers, industries, economic development personnel and water footprinting methodology development professionals. Water footprinting is a young and evolving science. This work will contribute to the dialogue on water resource sustainability and the development of water footprinting approaches. It will highlight the provisions of the Compact/Agreement, and – through quantitative analysis – evaluate the extent to which water footprinting approaches can demonstrate or support utilization of the Region's abundant and sustainable water resources as a business advantage.



October 1, 2010
Revised November 5, 2010

**Optimizing Industry Water Use
Great Lakes Protection Fund Project # 926**

*Effective Application of Water Footprinting
Methodologies to Industrial Operations in the
Great Lakes Basin*

Phase II Project Description

*Providing Critical Policy Guidance Needed for
Sustainable Great Lakes Water Resource Use*

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Introduction and Overview

Water footprinting and other water accounting approaches and tools are being used around the world to characterize water use and guide work towards water resource sustainability, especially in water scarce regions. There is interest in using these approaches in the Great Lakes Region where the Great Lakes – St. Lawrence River Basin Water Resources Compact and Sustainable Water Resources Agreement are the foundation for attaining sustainable water use. The Compact/Agreement evaluates withdrawals primarily based on their potential for impacts to water and water dependent resources of the Great Lakes Basin. The Expert Panel convened in Phase I of the Optimizing Industry Water Use project (GLPF Project #926) was in agreement that impact, not the quantity of withdrawals, was of greatest concern in the Great Lakes where water supplies are characterized as robust. Water footprinting tools, however, are generally perceived to be focused on water withdrawal quantity and most often used in water scarce regions. It is unknown how application of these tools would be applicable in the Great Lakes Region where water supplies are more abundant.

This phase of the CGLI project will apply the use of water footprinting tools to industrial water use at pilot facilities located within the Great Lakes Basin to assess their utility and effectiveness in advancing the sustainability of the Region's water resources. The results of this project will be of value to Great Lakes State and Provincial water resource managers, resource protection policy decision makers, industries, economic development personnel and water footprinting methodology development professionals. Water footprinting is a young and evolving science. This work will contribute to the dialogue on water resource sustainability and the development of water footprinting approaches. It will highlight the provisions of the Compact/Agreement, and – through quantitative analysis – evaluate the extent to which water footprinting approaches can demonstrate or support utilization of the Region's abundant and sustainable water resources as a business advantage.

The Great Lakes Basin is Unique:

As is well known, the Great Lakes Basin is unique in many ways. It contains 20 percent of the world's fresh water, has vast special and significant ecosystems, is host to a large and diverse human population, and produces one-third of the U.S. gross State product¹. To support and protect these interdependent systems, the Region relies on governance systems specifically tailored for water resource management. Sustainable use and management of Basin water resources is an objective of these systems. Use of these resources in a sustainable way is also required to support much needed economic development and a rejuvenated jobs and social structure for the Region.

Industry is Dependent on Great Lakes Water Resources:

Access to ample high quality water supplies is essential for the support of Great Lakes industry. These same water supplies must also support human populations and ecosystem needs. Water withdrawals that support industry, including those needed for electric power generation and recorded in the Great Lakes – St. Lawrence River Basin Water Resources Council Water Use

¹ The Vital Center: A Federal-State Compact to Renew the Great Lakes Region, The Brookings Institution Metropolitan Policy Program, October 2006.

Database², amount to seven percent of the number of withdrawals listed. However, they make up 34 percent of the total volume withdrawn. Yet, a large percentage of this water is returned, and actual consumption is far lower than the volume withdrawn. Tools suited to the unique character of the Great Lakes Region are needed to track and manage the sustainability of these withdrawals. Industry is familiar with Compact/Agreement provisions for managing Great Lakes water resources. Industry is much less familiar with water footprinting tools and how application of these to Great Lakes Basin facilities might help characterize their water withdrawals and any associated impacts.

Can Water Footprinting Protocols be Applied to the Basin?

If water footprint protocols are to be used to evaluate water use activities in the Great Lakes Basin they must be tested to establish suitability. The tools used must reflect the specific circumstances relating to the facility in which the water is used as well as the characteristics of the source from which it is withdrawn – including the governance system used to manage the resource. Water resource managers need information about how water footprinting analyses can be interpreted when applied to Great Lakes Basin withdrawals.

For the most part the footprinting/accounting protocols currently under development have not been widely applied to industrial water uses where extensive water reuse/recycling and high return rates are common practice. Likewise, they have not been widely applied in regions like the Great Lakes where supplies are robust and governance/regulatory programs are mature.

With the guidance of a broad based expert panel and the support of LimnoTech (an internationally respected consultant firm) providing technical expertise, the Council of Great Lakes Industries (CGLI) has initiated this project to:

- increase awareness of the water footprinting by Great Lakes industries,
- determine the usefulness, advantages and disadvantages of the methodologies through application to Great Lakes industrial facilities,
- inform Great Lakes water resource managers on how water footprint analyses can be interpreted and used, and
- provide feedback to water footprinting tool developers on how the tool performs when used to evaluate Great Lakes industrial water uses.

The Compact/Agreement decision making standard for approving a new or increased water withdrawal within the Great Lakes Basin focuses on individual or cumulative impact on the ecosystem, not just water quantity. However, some water footprinting/accounting protocols appear to focus primarily on withdrawal quantity, not accounting for internal reuse, water efficiencies, or return flows. Other approaches may not be useful because they identify areas of water-stress on a very coarse scale. Some approaches may be in conflict with the conclusion from the Phase I work, that impact of water withdrawals was of primary importance in the Great Lakes, not quantity. A key question is to what extent can or should water footprint analyses be used to characterize Great Lakes water withdrawals? To what extent can these tools be used to characterize one-third of the water withdrawn within the Basin for industrial use?

² <http://www.glscompactcouncil.org/ViewWithdrawals.aspx>

It is also important to know how water footprinting approaches could be used by industrial water users to optimize their water stewardship programs, what role this information should play in Great Lakes water resource management decision making, and how water footprinting information could be used to support the Basin's sustainable industrial and commercial development objectives.

What this Project Will Do:

This project will:

- utilize technical experts to test water footprinting/accounting protocols by applying them to specific industrial water using facilities in the Great Lakes Basin,
- use an Expert Panel made up of Great Lakes stakeholders and customers to provide guidance, assistance, and feedback for this project,
- determine the benefits and effectiveness of applying water footprinting/accounting protocols to Great Lakes industrial withdrawals,
- distribute the results from this work to Great Lakes water resource managers, policy makers, industrial managers, economic development managers, and
- engage water footprinting tool developers and provide guidance for the continuing development of these methodologies for use within the Great Lakes Basin and elsewhere.

To achieve these objectives CGLI will bring industry, water footprinting/accounting practitioners, State and Provincial water resource managers, Regional Great Lakes policy architects and decision makers, and NGO stakeholders together to develop an understanding of how water footprinting can be best applied within the Basin. These individuals will make up the project's Expert Panel. Expert technical support will be provided by, the internationally recognized fresh water consulting firm, LimnoTech, the National Council for Air and Stream Improvement – the paper industry's environmental research organization, technical resources from other participating industry sectors including the American Petroleum Institute, the Portland Cement Association, the Edison Electric Institute and technical and engineering staff members from participating companies.

CGLI has excellent relationships with each of the stakeholder groups represented on the Expert Panel and is uniquely qualified to manage this project. CGLI staff and members are familiar with the industrial facilities and processes that will be studied in the pilot footprinting exercises.

The Project Customers:

There are several important customers for the results and outcomes from this project. They are identified in the following table along with project outcomes that will be sought for each.

Customer	Outcomes
State/Provincial water resource managers	<ul style="list-style-type: none"> • Engagement of State/Provincial water resource managers in the evaluation of water footprinting tools, • Engagement of State/Provincial water resource managers in application of selected footprinting tools to pilot Great Lakes industries; and • An opportunity for State/Provincial water resource managers to see what footprinting tools can and cannot do to inform water management decisions
Great Lakes Basin water resource protection policy decision makers	<ul style="list-style-type: none"> • Engagement of water resource protection policy decision makers in this project will equip them to determine how or if information generated through water footprinting tools should play a role in water use approval processes within the Great Lakes Basin.
Industries operating facilities in the Great Lakes Basin	<ul style="list-style-type: none"> • Enhanced awareness of water footprinting tools for industrial managers, • Demonstrates functionality of water footprinting tools to industry managers; and • Provides industry with opportunities to present manufacturing personnel perspectives regarding the use of water footprinting tools to Great Lakes Basin water resource managers and policy makers.
Great Lakes economic and sustainable development personnel	<ul style="list-style-type: none"> • Determination of how/whether water footprinting tools can be used to support sustainable development efforts in the Great Lakes Basin
Water footprinting methodology development professionals	<ul style="list-style-type: none"> • Demonstration of water footprinting tool functionality in large manufacturing facility settings, • Demonstration of water footprinting tool functionality in regions with robust water supplies, and • Opportunity to learn how water footprinting tools may need to be adjusted to fit region and site specific circumstances.

Building On The Results From Phase I Of Project #926

Phase II of the project builds on the valuable information acquired in Phase I. In that work, CGLI assembled an Expert Panel made up of stakeholders active in the development and implementation of Compact/Agreement provisions. The Panel determined that:

- Water footprinting/accounting protocols have been applied primarily to food and beverage production and agricultural practices.
- Application of water footprinting/accounting protocols to industrial processes and the development of procedures for doing so are currently underway.
- In the Great Lakes the important factor is the impact of water withdrawals, not the amount of the withdrawal.
- GLPF Project #926 can provide important information towards use and advancement of water footprinting practices both within the Great Lakes Region and internationally.

Details regarding the Phase I work and findings are available on the project communications web page at: <http://cgli.org/waterfootprint/waterfootprint.html>. The Expert Panel reviewed information regarding global water scarcity concerns, conducted a preliminary review of water footprinting and other water use accounting protocols currently in use or being developed, synthesized preliminary conclusions, and prepared a list of information needs regarding the applicability of these protocols to the pursuit of Great Lakes Regional water use sustainability.

The conclusions, findings, and information needs articulated by the Expert Panel were categorized into four areas:

- Water use
- Characterization of water use
- Planning for and achieving sustainable water use
- Utilization of water for the benefit of the Great Lakes Basin

These points are displayed in Appendix B and will serve as touchstones against which the application of water footprinting/accounting protocols in Phase II of this project will be viewed and quantitatively assessed.

Phase II Project Objectives and Approach

Phase II of the project will:

- Complete the in-depth quantitative review of the available 17 footprinting/accounting protocols examined in the Phase I work and select example protocols for detailed continuing study and use. Preliminary review of the numerous water footprinting/use accounting and impact protocols indicates that considerable overlap exists with respect to the specific metrics contained in the protocols. Individual metrics typically fall into one of four categories: describing water use/consumption (amounts, sources, losses, etc.), pollutant loads (i.e., quality of effluents), protection of local ecology (i.e., impacts of withdrawals and discharges on resident biota, particularly effects on sensitive biota), and governance (i.e., performance against applicable laws and regulations). Up to four test protocols will be selected based on which offer quantifiable metrics that can be applied to industrial water use in the Great Lakes Basin, to demonstrate sustainable water use and encourage improved practices. Metrics common across protocols will be noted. Further, statements regarding results that would be expected to have been obtained using protocols that have not been tested will be made, based on the in-depth review of each of the protocols. The Expert Panel will be asked to review the metrics analysis and provide comments on methodologies proposed for pilot testing. These comments will be factored into the final selection.
- In follow-up to the methodology assessment described above, the project team will apply up to four selected water footprinting/use accounting protocols to three representative Great Lakes industrial facilities and observe how these protocols: 1) determine water withdrawal and use implications or impacts; 2) characterize use; 3) treat recycling, reuse, and conservation practices; and, 4) relate to conclusions that may be drawn through application of Great Lakes Compact/Agreement decision making standards. The objectives of this work are to:
 - Enhance knowledge regarding water footprinting/accounting tool use within industry, water resource management, policymaker, and general stakeholder communities.
 - Determine how water footprinting/accounting tools are of value for evaluation of Great Lakes sustainable water use practices by industry.
 - Establish what links can or cannot be made between footprinting/accounting tool and Great Lakes Compact/Agreement decision making standards.
 - Provide recommendations on how water footprinting/accounting tools could or could not be used to support sustainable economic development initiatives within the Great Lakes Basin.
 - Provide feedback and comments to water footprinting tool developers regarding changes or additions needed, if any, to improve functionality.

The Water Footprint Network (WFN) methodology is of particular interest because a full water footprinting assessment according to the WFN method is a comprehensive effort that includes four steps:

- 1) set goals and review scope,
- 2) perform the water footprint accounting work,

- 3) conduct complex sustainability assessments, and
- 4) prepare footprint response formulation.

The first step, setting goals and scope for the project was completed in Phase I of this project. Phase II is aimed primarily at step 2, performing the water footprint accounting work. This is the most data and resource intensive portion of the work. Phase II work will include interpretive analyses that will complete initial step 3, sustainability assessment and step 4, footprint response portions of the work. Defining the scope of effort needed to complete step 3 and step 4 work will depend on the findings from step 2, the footprint/accounting work. Depending on the outcome of this Phase II work, more detailed studies may be needed to complete sustainability assessments and identify footprint response measures for the pilot facilities. These may be proposed as a Phase III effort. Alternatively, it may turn out that the individual facilities will elect to complete these final assessments and response initiatives on their own.

The Project Pilot Facilities

Phase II of the project will apply water footprinting/accounting protocols selected for testing to three industrial sectors. The facilities to which the protocols will be applied will be actual existing industrial facilities. In follow-up to the Phase I project work, CGLI has recruited Great Lakes industrial facilities that will serve as pilot sites for the water footprinting studies. The following four companies have agreed to participate:

- NewPage Corporation – Paper mill facility located in Escanaba, Michigan
- Shell Canada – Refinery at Sarnia, Ontario
- Lafarge North America – Cement plant at Alpena, Michigan
- Consumers Energy – J. H. Campbell fossil fuel electric generating station at Grand Haven, Michigan

However, the budget for this project is based upon completing studies at just three facilities. Final arrangements with plants to be included in the study will be made when the project is approved. The decision on which of the facilities will be included in this work will be based on timing factors, availability of data, which mix of facilities produces the most information about how the footprinting tools work in industrial scenarios, etc. CGLI has also had other facilities express interest in cooperating. Some of these want to participate as observers. Others may want to perform some calculations using models that come from the Phase II project work. CGLI will work with these facilities to see if additional funding can be made available to augment the three facility trial work.

Potential for Follow-up Studies

Beyond the information that may be made available through water footprinting procedures (i.e. characterization and accounting information from step 2, impact assessment and footprint response information from steps 3 and 4) an additional use for some protocols may be to use them as certification systems. During Phase II the team will collect, review, and report on protocol elements related to certification systems. This information will be used to develop recommendations regarding further work in the impact assessment, footprint response, and

certification areas. It is anticipated that Phase III work will be proposed to further address the needs and work that can be done to advance Great Lakes water sustainability pursuits.

Serving the Project Customers

The customers for this work are summarized in the table on page 3 of this proposal. These include State and Provincial water resource managers, Great Lakes Basin water resource protection policy and decision makers, industry personnel, Great Lakes economic and sustainable development personnel, and architects of water footprinting/accounting tools – the methodology development professionals. Anticipated information useful to these customers includes:

- Detailed familiarization with water footprinting/accounting protocols
- Boundaries for application of water footprinting/accounting protocols to industrial water use situations
- The implications of use of water footprinting/accounting tools within Great Lakes Compact/Agreement decision making processes

Architects of water footprinting/accounting tools will find the outcome of this work instructive as they proceed with their developmental work regarding methods and tools.

An important aspect of this project is that these customers are all involved in the project as part of the Expert Panel. This provides direct engagement of these persons in decisions regarding project work, direction, and scope. And, it gives them a front line view of outputs and results throughout the entire project.

Outcomes

This project pursues outcomes identified in the initial Great Lakes Protection Fund request for proposal – responding to three key needs of the Great Lakes Region:

- A balanced and sustainable ecosystem
- Economic stability and growth
- The ability to produce goods, services, and the support of social systems essential for maintenance of a sustainable society.

A balanced and sustainable ecosystem can only be supported by maintaining the health and sustainability of the water resources that are unique to the Great Lakes Basin. This project will determine how use of water footprinting/accounting tools to evaluate and characterize industrial water withdrawals may support this outcome.

Enhancing and maintaining a healthy industrial base in the Great Lakes Basin is an essential element in the drive toward the Region's economic stability and growth. This project will determine, using actual pilot case studies, how water footprinting tools may support or enhance this outcome. This project will help sustainable development developers determine how, or if, water footprinting tools may support the sustainable use of Great Lakes Water Resources as an economic development advantage for the Region.

Industry must have assured access to water supplies to be successful and operate sustainable facilities. Industry personnel are very concerned that water footprinting tools may not include recognition of the water reuse, recycling, and conservation measures that are practiced by Great Lakes industries – or otherwise fairly characterize their water use practices. This project will determine (among other outcomes) whether or not these concerns are valid. If they are, the project will inform water resource managers, policy decision makers, and footprinting tool developers of changes in results interpretation or tool design needed to take these measures into account.

This brief discussion of expected project outcomes includes but a few of the questions raised regarding the use of water footprinting during the Phase I work. For more information about these and the other issues which this project will address during the pilot phase, see the summary of Phase I conclusions provided in Appendix B of this proposal. Additional information can also be found on the Project website at: <http://cgli.org/waterfootprint/waterfootprint.html>

Outputs, Deliverables and Other Products

Project Phase II outputs, deliverables and other products include:

Maintenance of the project Expert Panel (see Appendix A) who will serve as project participants, reviewing and providing expertise and recommendations for use by project contractors and managers. Their participation is critical to the project and it is intended that this panel represent a full range of interests within the Great Lakes Region. The existing panel consists of 38 individuals who were self selected following a canvas of 119 candidates. The make-up of panelists among stakeholder interests is:

- Academic - 3
- Government State or Provincial - 8
- Government Federal (both U.S. and Canada) - 5
- Environmental organizations - 4
- Research organizations - 4
- Public utilities -1
- Industry – (non CGLI members) 6, (CGLI members) 7

Panel make-up will be adjusted and additional members will be recruited in Phase II as needed to maintain sufficient balance and/or to accommodate interests of key individuals – especially State/Provincial water resource managers.

The Panel will be consulted and asked to comment on work plans, data sets and other information used at project decision points to define tasks, intermediate work products, and draft reports. Once work products are finalized, Panelists will be given the opportunity to provide comments. Panel members have been selected based on their expertise and experience in the management of water resources – particularly those within the Great Lakes Basin. They understand the science, the nature of the governance of the Region, long standing policy directions, capabilities of Basin support structures, the competing interests involved in utilizing and protecting the resource, and other factors of importance. These

perspectives are needed to ensure that the task of applying water footprint protocols to Great Lakes industrial situations is conducted in consideration of all of these factors.

The project web page available at <http://cgli.org/waterfootprint/waterfootprint.html> will be maintained during and following project work to make reports, outcomes, and other materials available to project participants and other interested parties. Though CGLI will maintain the project website, CGLI does not purport to “own” the results of this project work. The purpose of the project is to inform all stakeholders of the Great Lakes water resources management process on the role that water footprinting can, or cannot play, in the pursuit of sustainability in the Great Lakes Basin. Expert Panel members will be encouraged to make the information produced by this study available to their constituencies. It is unknown at the outset to what extent, if any, some facility operational data required to conduct the footprint studies may be regarded as proprietary. Should this situation occur, the Expert Panel will be made aware of this issue and arrangements will be sought, acceptable to all, that will allow protection of the information without compromise to the final study results.

Provide project reports, presentations, and other elements identified through a communications plan that will be circulated widely to publicize findings, recommendations, and related information – including links to project outputs and deliverables. CGLI has been involved in several Great Lakes Basin studies and assessments funded by governments, foundations, and research organizations that require large scale dissemination of the results. Examples include the work leading up to the report entitled, *Healthy Waters, Strong Economy. The benefits of Restoring the Great Lakes Ecosystem*, produced by the Brookings Institution and reports published and distributed by the Healing Our Waters Coalition. CGLI will use its experience, and resources shared, with the wide distribution of these work products to develop the communications strategy needed to broadcast the results of this study.

Solicitations for comments on project work will be extended through the project communications and website links. Though the bulk of comments are expected to come from Expert Panel members, comments from the public at large will be encouraged and accepted. CGLI will make note of these comments in project reports and note how they were utilized.

The specific nature of the work products will be determined in consultation with the project Expert Panel. They are expected to include web-based information (with provisions for downloads and comment/response opportunities), journal articles, presentations at selected water resource management conferences/symposia – both within and outside of the Great Lakes Basin, and water use characterization check-lists, etc.

As appropriate, CGLI will make use of its position as a formal participant and observer in several Great Lakes Regional, National (in both the U.S. and Canada), and International resource management and water policy organizations to provide summaries of project work products. These include, but are not limited to: the Council of Great Lakes Governors, the Great Lakes Commission, the Binational Executive Committee, the International Joint Commission, the World Business Council on Sustainable Development, and others.

Strategy for Completing Phase II Project Tasks and Plan of Work

Task 1 – Facility Water use Descriptions:

As part of Phase I work, water needs and practices for four sectors – pulp, paper, and forest products; petroleum refining; chemical manufacturing, and mining, quarrying, and cement manufacturing – were described and posted on the project website. To initiate Phase II, complete descriptions of water uses at the pilot facilities will be prepared to guide the footprinting study work and provide detailed information for Panel members and stakeholders on water use practices in these industries. CGLI will compile these water use descriptions utilizing detailed information provided by pilot facility personnel. CGLI’s project director is an industrial chemist with extensive experience in water use practices within the paper, power generation, and chemical process industries. In addition to this expertise, industry specific research organizations such as NCASI (National Council for Air and Stream Improvement – the paper industry’s environmental research organization), EEI (the Edison Electric Institute), the American Petroleum Institute, and the Portland Cement Association will be consulted – and provide representatives for the Expert Panel. The expertise of personnel at the pilot facilities and these industry associations, along with that of CGLI will ensure thorough assembly of water use information at each pilot location.

Task 2 – Detailed Evaluation of Water Footprinting/Accounting Protocols:

Water footprinting/accounting protocols currently in use and/or being developed were inventoried and briefly described in Phase I of the project. Concepts behind the various protocols were examined. Organizations and expert groups pursuing these methodologies were identified. (See water footprinting links on project website at:

<http://cgli.org/waterfootprint/waterfootprint.html> and presentation by Paul Weigand of NCASI at:

<http://cgli.org/waterfootprint/WaterFootprintWorkshopSlideDeck/SlideDeck3waterFootprinting.pdf>.) The protocols reviewed included:

- Aquawareness
- Alliance for Water Stewardship
- Blue Certification Program
- Corporate Water Gauge
- European Water Partners
- Federation House Commitment to Water Efficiency
- Global Environmental Management Initiative
- Global Reporting Initiative
- Global Water Tool (WBCSD)
- UNEP/SETAC Life Cycle Initiative
- Strategic Water Management Framework (Australia minerals)
- UN CEO Water Mandate
- Water Brief for Business SEE Initiative
- Water Footprint Network
- Water Neutral Foundation
- WaterSense Certification Scheme
- Water Stewardship Initiative

These efforts are in various stages of development, and approximately one-third of the initiatives actually offer quantitative approaches that can be applied to specific water use scenarios. During this task, the team will compile specific descriptions of the capabilities of each of the 17 initiatives, with an emphasis on the subset that address the need for practical tools. The discussion points listed in Appendix B will guide this process. As examples, the team will consider the tool's utility for the industrial water sector (vs. water use by individual users), evaluate if the tool can be used to highlight water use efficiency measures, and determine if the tool can be used to benchmark sustainable water use practices. Importantly, the team will explore if and how the protocol can be used to highlight the water-related advantages of Great Lakes industries, and the long-term sustainability of the water supply.

The advantages and limitations of each approach will be highlighted, and they will be categorized in terms of input metrics, methodologies used, and outputs provided, as well as applicability to Great Lakes water management. As an example, the Global Water Tool developed by WBCSD helps identify high water-related risks by overlaying locations of water use with water scarcity indices. The tool may not be suitable for assessing specific local impacts in an abundant region such as the Great Lakes Basin.

Up to four approaches will be selected for specific application in Task 3 on the basis of which offer quantifiable metrics that can be applied to industrial water use in the Great Lakes Basin, to demonstrate sustainable water use and encourage improved practices. It is anticipated that the methodology of the Water Footprint Network (WFN) will be one protocol selected, for several key reasons. The network is a stakeholder-driven process that has involved the public sector, NGOs, and corporations; it is about development of methods and not advocacy; and the WFN method is grounded in science. Importantly, the WFN approach goes beyond accounting and includes an evaluation of the sustainability of the water use and formulation of response actions to address any impacts.

As described above, the test protocol selection activity will be carried out in consultation with the Expert Panel. In addition, to the extent that the metrics, methodologies, or outputs differ between protocols tested and others on the list, the project final report will include a detailed description of all protocols evaluated. A recent document prepared by the World Business Council for Sustainable Development entitled: *Water for Business: Initiatives Guiding Sustainable Water Management in the Private Sector* will be a useful resource in this regard. The outcome of this task will be a document that summarizes each initiative, the usefulness for characterizing individual facility water use, and the rationale for selection of the protocols that will be tested in Task 3.

Task 3 – Conducting the Footprint Analyses

After the test protocols have been selected, work will proceed to apply the methods and explore how the water footprinting/accounting tools characterize water use and associated impacts. The first step will involve the collection of required data and information from the selected facilities. It is anticipated that the compiled data will address the requirements of all approaches that are evaluated (i.e. separate data will not be collected for each selected method). Data collection is often the most challenging and time-consuming task in a water footprint assessment. Some data

may be highly confidential, or contacts may be unwilling to provide information due to concerns about competition or comparisons within their industry or region. Confidentiality agreements can help in this regard, but this factor can constrain the amount of information that may be shared externally. When it is not possible to acquire site-specific data, industry averages will be used.

The team will explore how the results should be interpreted, modified, or used to direct water resource management activities by and at the facilities studied as well as influence policy within the Great Lakes Basin, particularly within the context of provisions contained in the Great Lakes – St. Lawrence River Basin Water Resources Compact/Agreement. Articulation of these outcomes and observations will be accomplished in consultation with the Expert Panel.

The water footprinting work will be conducted by and under the guidance of LimnoTech, the project's primary consultant. LimnoTech has extensive experience in the development and use of water footprinting tools and has demonstrated the capability to successfully complete this project (see Attachment 6). In addition, NCASI will perform portions of the water footprint analysis for the paper mill facility pilot study. NCASI has also worked extensively in the field of water use accounting and footprinting and has the experience and expertise necessary to complete this work. NCASI will work in cooperation with LimnoTech, collectively strengthening the study team. In addition LimnoTech will collaborate with pilot facility staff, and the skilled water management professionals available within the industry associations who will participate in this study. Further, CGLI, LimnoTech, NCASI and other participants will collaborate with recognized water policy organizations, including The National Wildlife Federation, The Nature Conservancy, the World Business Council on Sustainable Development, the Water Stewardship Alliance, Water Footprint Network, Water Environment Federation and Sustainable Water Resources Round Table while conducting this work. Collectively, CGLI, LimnoTech, and NCASI have excellent relationships and contacts with these organizations. This will assure beneficial and successful collaboration outcomes.

Task 4 – Reporting and Communicating Project Results:

A communications plan will be developed to maximize dissemination of results to customers, stakeholders and other interested parties. Details will be determined through development of the communications plan, but it is expected that project outcomes will be disseminated through reports, technical bulletins, etc. via the project website and other means. Expert Panelist organizational newsletters and other publications may also be used. Opportunities for publishing results as scientific papers made available for presentation at conferences and symposia. Organizations developing water footprinting/accounting protocols will be especially targeted to receive project outcome information. It is important to note that the timing of this project is such that it may be possible to present the results of this work at World Water Week in Stockholm – 2011. Phase I work identified communication of water use information as a particular need. The communication plan developed in Phase II will address this need as well. CGLI will be primarily responsible developing and implementing the communications plan. LimnoTech, NCASI and other collaborators will prepare reports and data that will be distributed via the plan. They may also serve as presenters of information at conferences and other fora.

Project Responsibilities and Division of Tasks

CGLI will serve as the project managers, Expert Panel coordinators, team leaders, and be primarily responsible for assembling data and descriptions of pilot facility water use practices, and conservation opportunities that will be used to test the water footprinting/accounting protocols. CGLI will collaborate with industry research organizations, trade associations, and individuals at pilot facilities to collect information, expertise, operational and technical data. CGLI will also utilize relationships with key water policy organizations to obtain project support information, expertise, and create project output review opportunities. This activity will be particularly important for articulation of how water footprinting protocols should be applied to Great Lakes water resource policy development. Examples of these organizations include The National Wildlife Federation, The Nature Conservancy, World Business Council on Sustainable Development, Water Stewardship Alliance, Water Footprint Network, Water Environment Federation, and Sustainable Water Resources Roundtable (SWRR).

LimnoTech and NCASI will serve as project consultants. Industry representatives from facilities to be tested and members of the Expert Panel will be organized into working groups to accomplish work plan tasks. The workgroups will locate information, review consultant work products and results, utilize information and comments provided by the Expert Panel, and provide feedback and recommendations to the consultants and CGLI.

Project coordination, communication, and information sharing activities will take place via conference phone calls, project website sharing, e-mail, and other telecommuting modes. For some tasks and to obtain specific information limited face to face meetings, workshops, and/or facility visits will be utilized. In Phase I of the project, Expert Panel members participating in person found the face to face Workshop to be an extremely efficient and effective way to view and discuss a large amount of information. Panelists who participated via teleconference connections appreciated that opportunity but indicated that presence in person would have been preferable. To maximize opportunities to contribute, Phase II events will also provide both in person and remote participation opportunities.

Project Schedule

The term for this project is anticipated to be nine to twelve months. Some of the tasks outlined below will be performed concurrently.

Task No.	Description	Start Date	Anticipated Completion Date	Milestones	Deliverables
1	Update and prepare detailed industry water use descriptions including opportunities for conservation for sectors and facilities used for protocol testing	Project inception	Six months from project inception	<ol style="list-style-type: none"> 1. Review existing descriptions with industry participants 2. Up-date and expand descriptions 3. Identify conservation opportunities 4. Review/edit revised descriptions via Expert Panel consultation process 	Revised industry water use descriptions,
2	Complete water footprinting/ accounting tool protocol descriptions, attributes, and use context information. From the range of tools available, select specific tools to be tested.	Project inception	Eight months from project inception	<ol style="list-style-type: none"> 1. Updated descriptions of water footprinting/ accounting tools 2. Summaries of how tools address/do not address Expert Panel discussion points 3. Review/edit tool attributes and select tools to be tested using Expert Panel Consultation Process 	Summaries of selected tools with analysis of application elements that characterize individual facility water use and rationale for selection of test protocols.
3	Conduct footprinting/ accounting tool tests and relate results to Great Lakes Compact/ Agreement policy development objectives	6 months following project inception	Nine months following project inception	<ol style="list-style-type: none"> 1. Policy analysis regarding use of footprinting/ accounting tools and relationship to Great Lakes Compact/ Agreement processes 2. Review/edit policy analysis on basis of Expert Panel consultation process 	Project reports and outcome release materials
4	Publicize, and distribute project results	10 months following project inception	Distribution continues after project completion	<ol style="list-style-type: none"> 1. Communication plan to disseminate results. 2. Distribution, publication, and posted notice of project outcomes 	Communication Plan, Distribution, publication, and posted notice of project outcomes

Assuring Project Success and Quality Control

The key to the success of the project is the experience level of the project team. CGLI has extensive experience in industrial process evaluation and water resources policy development, project management, and the coordination and facilitation of stakeholder groups such as the Expert Panel. The Expert Panel members have an outstanding background in industrial water use practices, environmental management, impact assessment, and policy analysis. The project consultants, key team members and several Expert Panelists also have experience in the developing area of water footprinting and water use accounting, including certification in the WFN assessment methodology. This assures their ability to analyze information generated through this project and critique project outputs. Project records of observations and comments as well as documentation on how the peer review information has been used will be placed on the project website (when not considered confidential business information). Public review comments on all project output materials will also be solicited.

Project Consultants

LimnoTech of Ann Arbor, Michigan will serve as the primary consultant for this project. NCASI (the National Council for Air and Stream Improvement), a pulp and paper industry environmental research organization will assist with the pulp and paper industry related portions of the study. Both organizations have industrial process knowledge and the development of water footprinting/water use accounting protocols. For more details regarding qualifications, see Attachments 6 and 7.

The duties of the project consultants include:

- Assemble details regarding application context, input information, model calculations, and outputs for each of the water footprinting/use accounting protocols listed on page 5 of this project description.
- Prepare comparison of protocols for use by the Expert Panel in selecting protocols to be tested.
- Calculate water footprints/complete assessment tool reviews for each industry facility tested.
- Provide reports and analysis materials for use by Expert Panel in interpretation of results and formulation of water footprint study conclusions.

The CGLI Project Management Team

Project management, the industrial water use information development, and policy implications portion of the work will be carried out by the Council of Great Lakes Industries. Personnel involved are:

Project Director – George H. Kuper

Mr. Kuper will serve as Project Administrator, supervising those responsible for carrying out project activities, providing expertise in the conduct and management of large scale research programs, contributing to project information gathering pursuits by drawing on

his vast experience in industrial operations, serving on numerous policy development fora, and serving a primary fiduciary role with regard to project financing and expenses.

Project Manager – Dale K. Phenicie

Mr. Phenicie will serve as Project Director, maintain, recruit, and serve Expert Panel members, utilize extensive industry process knowledge and experience to collect and prepare industry water use information, establish project schedules, track project progress, maintain project files, review project documentation, serve a QA function with respect to review of contractor work products, and coordinate all scheduled project activities.

Evelyn Strader – Communications Director

Ms. Strader will direct communications between study participants, establish communication vehicles, maintain website, review and edit (grammatically) documents, assist in the facilitation of project working sessions or other events, and work with team members develop a communication plan for project outcomes.

Marcia Rose – Financial Administrator

Ms. Rose will keep project financial records, correspond with study participants on financial aspects of the project and prepare financial reports for the Project Director.

Janet Rieke – Administrative Assistant

Ms. Rieke will assist with the planning of project related working sessions and provide administrative support to CGLI members of the project team.

Project management activities will require the following fraction of time on task in each normal workweek for each of the CGLI participants:

- George Kuper – 10 percent
- Dale Phenicie – 30 percent
- Evelyn Strader – 10 percent
- Marcia Rose – 5 percent
- Janet Rieke – 5 percent

Industry personnel from the sectors and/or facilities for which the protocols will be tested will provide data, information, and technical support to the project consultant. They will come from companies, trade associations, and/or research organizations that support the industries studied in this project.

Project Budget

CGLI personnel are all contracted individuals. Consequently, CGLI expenses for this project will all be contracted expenses. Additional project expenses will be those needed for the project consultants and funds needed to support working sessions for the Expert Panel.

Item	Amount
Expenses for project consultant (contracted costs).	LimnoTech \$146,000 NCASI \$20,000
Expenses associated with Expert Panel working events	\$10,000
CGLI project administration, industry water use descriptions, footprinting analysis and descriptions, water policy analysis expenses (contracted costs).	\$73,000
Total project cost	\$249,000

Task by Task Project Costs

Task	Description	Amount			
		Contractor Costs	Expert Panel Working Events	Project Management Costs	Totals
1	Complete industry water use descriptions, data assembly including opportunities for conservation	CGLI \$20,000 LimnoTech \$4,000	\$2,500	\$3,000	\$29,500
2	Assemble water footprinting/ accounting tool descriptions and information – select tools for testing	CGLI \$5,000 LimnoTech \$24,000	\$2,500	\$3,000	\$34,500
3	Conduct analysis using of footprinting/ accounting tools, compare outcome with Great Lakes Compact/ Agreement policy development objectives, prepare outputs/reports	CGLI \$23,000 LimnoTech \$114,000 NCASI \$20,000	\$2,500	\$3,000	\$162,500
4	Publicize/distribute project results	LimnoTech \$4,000 CGLI \$13,000	\$2,500	\$3,000	\$22,500
Totals		\$227,000	\$10,000	\$12,000	\$249,000

Contracting Party

The Council of Great Lakes Industries (CGLI or the Council) is a non-profit organization³ that represents the common interests of U.S. and Canadian industrial organizations from the manufacturing, utilities, transportation, and trade sectors that have investments in the Great Lakes Basin.

Founded in 1991, CGLI was established for the express purpose of addressing Great Lakes Regional economic development and environmental management issues. The Council works to ensure that industry is a substantive partner in the Great Lakes region's public policy development process. The Council is a partner organization with the World Business Council for Sustainable Development, Geneva, Switzerland.

Central to the success of this project will be the ability to attract, utilize, and obtain consensus from key industry personnel within the Great Lakes Basin. CGLI is uniquely qualified to obtain this "buy-in." Through the membership and additional industrial and business associates, CGLI has well-established access to these key individuals.

CGLI membership represents the chemical, petroleum, iron and steel, electric utility, pulp and paper, and metals/mining sectors. CGLI primary principals are seasoned professionals each of whom have decades of industrial development and facility operation experience. They have comprehensive knowledge of industrial business plan tracking/evaluation and understand the intricacies of incentives that encourage one particular business behavior over another. In addition, CGLI has broad experience in communicating with industry personnel, stakeholders, and the public at large on complex issues. This will assure successful dissemination of project outcomes.

CGLI has been an innovator in many areas, including environmental management system development. A pioneering effort established a Total Quality Environmental Management protocol for Great Lakes industries. CGLI's *TQEM Primer and Self-Assessment Matrix*, published in 1993, provided a template for development of programs within member companies and other organizations which have now become full scale environmental management systems. This work significantly influenced the subsequent development of Baldrige criteria and ISO standards for environmental quality.

CGLI has been an organizer of and/or participant in many key stakeholder driven projects within the Great Lakes Basin. Council representatives have served on and provided leadership for such efforts as the International Joint Commissions Virtual Elimination Task Force, and the U.S. EPA and Environment Canada organized Great Lakes Binational Toxics Strategy. CGLI's participation in the GLPF *Netting Benefits* project brought needed expertise and perspectives from stakeholders representing a number of different industry sectors. The coordination of and collective participation of the differing sectors as represented through CGLI has facilitated consensus building in these many multi-stakeholder experiences.

CGLI is recognized by the U.S. Internal Revenue System as a 501 C (6) corporation.

³ See Attachment 2

Access to Project Records Policy Statement

CGLI hereby states that the Great Lakes Protection Fund shall have access to the project team's protocols, methods, interim results, and financial information; and assures compliance with the Fund's policy on Intellectual Property.

Appendix A

<p>Optimizing Industry Water Use Great Lakes Protection Fund Project # 926</p> <p><i>Effective Application of Footprinting Methodologies to Industrial Operations in the Great Lakes Basin</i></p> <p>Expert Panel</p>
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Organization	First Name	Last Name	Title
Alliance for Water Efficiency	Bill	Hoffman	Technical Advisor
Alliance for Water Efficiency	Mary Ann	Dickinson	Executive Director
American Forest & Paper Association	Jerry	Schwartz	Senior Director
Ann McCabe and Associates, Inc.	Ann	McCabe	President
BP	Tim	Weisenberger	Environmental Advisor - Water Advocacy
CH2M Hill	Jan	Dell	Vice-President, Energy Division
DuPont	Amanda	DeSantis	Project Director DuPont Corporate Remediation Group
Consumers Energy Company	John	Gulvas	Senior Environmental Planner
Council of Great Lakes Industries	George	Kuper	President
Council of Great Lakes Industries	Dale	Phenicie	Project Director
Council of Great Lakes Industries	Janet	Rieke	Research Assistant
Council of Great Lakes Industries	Evelyn	Strader	Communications Director
Edison Electric Institute	Sarah	Ball	Manager, Environmental Affairs
Great Lakes Commission	Thomas	Crane	Deputy Director
Great Lakes Environmental Research Laboratory National Oceanic & Atmospheric Administration	Drew	Gronewold	Physical Scientist / Hydrologist
Great Lakes Protection Fund	J. David	Rankin	Vice-President & Director of Programs
Great Lakes Protection Fund	Shannon	Donley	Associate Program Officer
International Joint Commission	Saad	Jasim	Director, Great Lakes Regional Office (Observer)
Lafarge Canada, Inc.	Rob	Cumming	Environment & Public Affairs Manager
Lafarge North America, Inc.	Brian	Gasiorowski	Regional Environmental Manager
Michigan Department of Natural Resources and Environment	Brant	Fisher	Environmental Engineer Water Use & Withdrawal Program
Michigan Department of Natural Resources and Environment	Joe	Lovato	Chief, Water Withdrawal and Contamination Investigation Unit Drinking Water and Environmental Health Section
National Council for Air & Stream Improvement, Inc.	Paul	Wiegand	Vice President
National Roundtable on the Environment and the Economy	Jill	Baker	Senior Policy Advisor

Organization	First Name	Last Name	Title
National Wildlife Federation	Nathalie	Chin	Restoration and Water Resources Policy Intern
New York State Department of Environmental Conservation	Don	Zelazny	Regional Director
NewPage Corporation	Steve	List	Manager, Water Quality and Solid Waste Programs
Ohio Chamber of Commerce	Jennifer	Klein	Director, Energy and Environmental Policy
Rock-Tenn Company Paperboard Mill	Lowell	Knapp	Environmental Coordinator
Shell Oil Products US	Louis	Brzuzy	Senior Staff Environmental Specialist
The Brookings Institution	John	Austin	Non-resident Senior Fellow
The Future 500	Matt	Turner	Director, Global Stakeholder Initiatives Water Program
The Nature Conservancy	Rich	Bowman	Director, Policy for Great Lakes Project
U.S. Geological Survey	James	Nicholas	Michigan District Chief
University of Michigan Cooperative Institute for Limnology & Ecosystems Research	Allen	Burton	Professor and Director
University of Michigan Graham Environmental Sustainability Institute	Donald	Scavia	Director
University of West Virginia	Tom	Mahoney	President of the West Virginia Manufacturing Extension Partnership Director of the Industrial Extension Service
Wayne State University Law School	Noah	Hall	Professor and Director

Appendix B

Synthesized Expert Panel Discussion Points

Water Use:

- Water is not equally distributed over the planet, within nations, or within regions – including states. The need is to understand how much is available on a local scale.
- Specific high volume water uses attract attention and are hard to put into, or view in, the perspective of overall Great Lakes Basin significance.
- Our traditional water use governance and management practices have been long standing. These are now being evaluated in relation to concerns regarding whether or not allocation strategies match current knowledge regarding ecosystem and watershed management needs or principles.
- How best to relate regional water use practices to global needs or concerns is a particularly important question for the Great Lakes Basin. The carbon model has served as one reference point for addressing water use concerns. However, there is an important difference. As global carbon emissions concerns have highlighted local emissions, global water use concerns may direct attention to local water use practices. Unlike carbon, local water uses relate predominantly to local impacts. Therefore a water use assessment tool, developed within global concern perspectives, may not be suitable for addressing local water use impacts.

Characterization of water use:

- Water accounting – how much is being used now is important information. Not having a good understanding of water use in all sectors, for all purposes, everywhere creates concerns and impairs planning.
- However, it is not the use of water that is the issue – it is the impact of that use.
- Water is inherently reusable. How water is reused/recycled must be included as part of the characterization. How can withdrawers be “credited” for these efficiencies?
- Focusing only on quantity of water withdrawn can mean that key trade-offs are not properly evaluated. For example return flows vs. consumptive uses, increased energy use to achieve lower water discharges, etc. all need to be part of the picture.
- Policies established to address non-water issues, for example air pollution control, can impact water use. Air pollution control scrubbers require large volumes of water. Understanding when trade-offs are necessary is an important matter.
- Water use accounting is an important element in water management schemes. Not only does it serve as a basis for tracking management activities, it enhances management – “what gets measured gets managed.”
- All water footprinting protocols and assessment tools discussed during the workshop and being developed globally seem to be designed for application to a single withdrawer or possibly a sector of industrial withdrawers. How could the footprint process or other tools be applied to aggregate industrial withdrawals with other withdrawal categories?
- In some locales, there seems to be a growing trend towards businesses/industries obtaining their water from public water suppliers. As a result, the industrial use component is lost within the larger municipal withdrawal context – even though it may very likely be the great majority of the total withdrawal/consumptive use. Should an aggregate footprint then be developed for incrementally broader spatial scales (i.e., local watershed, Lake, Basin, etc)?

- Water use discussions need to include the full range of users. Agriculture, electric utilities, beverage manufacturers, including the bottled water industry, were not present for this discussion. However, these withdrawers may have to be addressed through separate but nearly identical processes. Combining them could result in too many varying points of view that would make progress challenging. Perhaps an industry effort can become the model for a footprinting process that can be applied to all Great Lakes water use categories.

Planning for and achieving sustainable water use:

- All protocols have some sort of water accounting provision – but only for the specific entity or locale being tested by the protocol.
- Return flows and discharges are important factors. The quality of water in these flows can have impacts.
- Water use accounting and management systems need to facilitate determination of water use “norms” for industry. Benchmarking of sustainable water use practices for Great Lakes industries would be very useful. These “norms” could be of assistance in determining “reasonableness” of the amount of water proposed to be withdrawn for a specific type of application.
- Industry’s water use needs vary between sectors and between facilities within sectors. Factors that influence water use include process and technology specifics as well as equipment age. Water use management regimes could provide incentives for investment in water use efficiency. These regimes may also need to be able to identify disincentives for investment in water use efficiency.
- Water use assessment protocols that include third party certification provisions have appeal to the public and outside observers. Industry needs to have comfort with certification process details and be assured of objectivity of the certifying organizations and personnel.
- Industry water use needs can change as conditions change. Market driven production levels, product mix, etc. as well as external factors such as climate change, local drought or excess precipitation and others are examples. Allowances for these variables are needed (i.e. adaptive management).

Utilization of water resources for the benefit of the Great Lakes basin:

- The Great Lakes Region must be able to utilize its water-related advantages as an incentive for industrial development.
- The benefit derived from use of the water should be included in the analysis. It is necessary to understand the value of the withdrawal to the community, the watershed/basin, and possibly even the nation in terms of the three sustainability parameters – environmental, economic, and social benefits.
- Water use analysis must demonstrate incentives to industry for efficient water use.
- A Regional water use management regime that provides incentives for industry but maintains needed controls can also foster sustainability both within industry and the Region.
- Industry “buy-in” of the Regional water use management regime is needed. To obtain this, the public and governments will have to provide assurance that access to water will be granted.
- Industry can use access assurance to create a competitive advantage for the Region.
- When water use policy is developed, science, social, and political factors must all be brought together in a spirit of support for sustainable economic development. The water

management/use assessment protocol must support this need. This said, it must be recognized that adverse public opinions will always occur – regardless of the simplest and most obvious of issues/actions.

- Determining how to tell the story of water use economic contribution to the Region, the value of specific water uses, and support for sustainable development is a communications matter. This project should address this need.
- Decision making processes regarding water withdrawal approvals within the Great Lakes Basin, in and of themselves, must not be overly burdensome on the applicants such that the water supply advantage held by the region is not negated.

Attachment 1

CGLI Board of Directors

Officers

Chairman - Robert C. Stempel, RP Associates
President - George Kuper, Council of Great Lakes Industries
Treasurer - Robert A. Rosenblum, Altarum (retired)
Secretary - Robert Weyhing, Clark Hill P.L.C.

Board of Directors

Jon W. Allan, Consumers Energy Company
Skiles W. Boyd, Detroit Edison Company
Kris Krause, Wisconsin Energy Corporation
George Kuper, Council of Great Lakes Industries
Paul Loeffelman, American Electric Power Company Headquarters
Al E. Matthews, Pliotron Corporation of America
Robert A. Rosenblum, Altarum (retired)
Robert C. Stempel, RP Associates

October 1, 2010

Attachment 2
Internal Revenue Tax ID Status

INTERNAL REVENUE SERVICE
DISTRICT DIRECTOR
P. O. BOX 2508
CINCINNATI, OH 45201

DEPARTMENT OF THE TREASURY

Date: SEP 24 1991

Employer Identification Number:

38-2973776

Contact Person:

DONNA CARLISLE

Contact Telephone Number:

(513) 684-3578

COUNCIL OF GREAT LAKES INDUSTRIES
174 S CLARK ST
DETROIT, MI 48209

Internal Revenue Code

Section 501(c)(6)

Accounting Period Endings:

December 31

Form 990 Required:

Yes

Addendum Applies:

No

Dear Applicant:

Based on information supplied, and assuming your operations will be as stated in your application for recognition of exemption, we have determined you are exempt from Federal income tax under section 501(a) of the Internal Revenue Code as an organization described in the section indicated above.

Unless specifically excepted, you are liable for taxes under the Federal Insurance Contributions Act (social security taxes) for each employee to whom you pay \$100 or more during a calendar year. And, unless excepted, you are also liable for tax under the Federal Unemployment Tax Act for each employee to whom you pay \$50 or more during a calendar quarter if, during the current or preceding calendar year, you had one or more employees at any time in each of 20 calendar weeks or you paid wages of \$1,500 or more in any calendar quarter. If you have any questions about excise, employment, or other Federal taxes, please address them to this office.

If your sources of support, or your purposes, character, or method of operation change, please let us know so we can consider the effect of the change on your exempt status. In the case of an amendment to your organizational document or bylaws, please send us a copy of the amended document or bylaws. Also, you should inform us of all changes in your name or address.

In the heading of this letter we have indicated whether you must file Form 990, Return of Organization Exempt From Income Tax. If Yes is indicated, you are required to file Form 990 only if your gross receipts each year are normally more than \$25,000. However, if you receive a Form 990 package in the mail, please file the return even if you do not exceed the gross receipts test. If you are not required to file, simply attach the label provided, check the box in the heading to indicate that your annual gross receipts are normally \$25,000 or less, and sign the return.

If a return is required, it must be filed by the 15th day of the fifth month after the end of your annual accounting period. A penalty of \$10 a day is charged when a return is filed late, unless there is reasonable cause for

Letter 948(00/CG)

-2-

COUNCIL OF GREAT LAKES INDUSTRIES

the delay. However, the maximum penalty charged cannot exceed \$5,000 or 5 percent of your gross receipts for the year, whichever is less. This penalty may also be charged if a return is not complete, so please be sure your return is complete before you file it.

You are not required to file Federal income tax returns unless you are subject to the tax on unrelated business income under section 511 of the Code. If you are subject to this tax, you must file an income tax return on Form 990-T, Exempt Organization Business Income Tax Return. In this letter we are not determining whether any of your present or proposed activities are unrelated trade or business as defined in section 513 of the Code.

You need an employer identification number even if you have no employees. If an employer identification number was not entered on your application, a number will be assigned to you and you will be advised of it. Please use that number on all returns you file and in all correspondence with the Internal Revenue Service.

If we have indicated in the heading of this letter that an addendum applies, the enclosed addendum is an integral part of this letter.

Because this letter could help resolve any questions about your exempt status, you should keep it in your permanent records.

If you have any questions, please contact the person whose name and telephone number are shown in the heading of this letter.

Sincerely yours,


Harold M. Browning
District Director

Attachment 3

CGLI Audited Financial Statements

Council of Great Lakes Industries Financial Report 2008



CGLI 2008

(Double-click to view)

Council of Great Lakes Industries Financial Report 2009



CGLI 2009

(Double-click to view)

Attachment 4

CGLI Current Institutional or Programs Budgets for 2009 and 2010

Council of Great Lakes Industries Budget for Years 2009 and 2010

	Actual * Jan - Dec 09	2009 Budget	Proposed 2010 Budget
Income			
40000 . Membership - Regular	132,000	160,000	151,000
40200 . Membership - Associations	75,000	75,000	45,000
41000 . Grant Income	47,000	41,000	40,000
42000 . Miscellaneous Income	24,474	25,000	40,000
43000 . Interest Income	729		
Total Income	279,204	301,000	276,000
Grant & Project Expense			
60000 . GLBTS	83,876	70,000	70,000
60400 . IJC Projects	1,097		
60500 . SOLEC	6,557	10,000	8,000
60710 . G.L. Economic Benefits Study	12,177	20,000	-
60800 . Annex 2001	9,352	15,000	12,000
60900 . Collaboration - GLRC	194		
60910 . GLWQA and Permitting	6,141	20,000	20,000
Total	119,396	135,000	110,000
61000 . Consultant Fees	86,250	90,000	90,000
62000 . Consultant Expenses	9,961	12,000	10,000
60600 . RUSC	442	2,000	1,000
60700 . Other - CGLI	771	5,000	1,000
62500 . Travel	4,508	4,000	4,000
63000 . Administrative Contract Service	11,316	15,000	15,000
64000 . Insurance	2,401	3,000	3,000
65100 . Audit Fees	5,100	4,500	4,500
65500 . Legal Fees	8,000	5,000	8,000
66000 . Phone / Fax / Internet	1,880	3,000	3,500
67000 . Postage / Print	243	1,500	1,000
68000 . Publications	1,988	2,000	2,000
69000 . Communications	18,586	19,000	23,000
71000 . Bank Fees	48		
72000 . Miscellaneous Expenses	40		
74000 . Bad Debt Expense	5,000		
Total Expense	156,533	166,000	166,000

Attachment 5

CGLI Primary Project Personnel Curricula Vitae

George Henry Kuper
President/CEO Council of Great Lakes Industries

Before joining the CGLI in 1994 as its President and Chief Executive Officer, George Kuper spent 6 years as President and CEO of the Industrial Technology Institute (ITI) – a not-for-profit manufacturing research, development, and deployment organization based in Ann Arbor, Michigan. With a staff of over 130 professionals, under Kuper’s leadership ITI became the largest organization of its kind assisting manufacturers in the United States, and became financially self-sufficient through both industrial and governmental contracts.

While executive director (1983-1988) of the Washington, D.C.-based Manufacturing Studies Board of the National Academy of Sciences, Kuper was the originator and one of the principal founders of the National Center for Manufacturing Sciences, a major cooperative research program among U.S. manufacturers. Under his leadership, the Manufacturing Studies Board also gained prominence for the identification of public policy issues facing U.S. manufacturing. For example, the board initiated the concept of the Engineering Research Centers program of the National Science Foundation, and contributed to the understanding of manufacturing issues through a pioneering book entitled *Toward a New Era in U.S. Manufacturing: The Need for a National Vision*.

In 1978, Kuper joined the General Electric Company where he reported to the Senior Vice President in charge of operations and was responsible for company-wide productivity improvement programs.

Kuper became recognized as a leader in the national effort to establish a productivity growth policy in 1975 when he was nominated by President Gerald R. Ford and confirmed by the U.S. Senate to serve as executive director of then newly created National Center for Productivity and Quality of Working Life.

Kuper has also been the founding principal in four corporations and director of five additional companies. He has been executive vice president of the Boston Venture Management Co., deputy director of the Mayor’s Office of Justice Administration in the City of Boston, and developed prototype productivity assessment programs for banking officers of the Morgan Guaranty Trust Company of New York.

In the last decade, Kuper has been chairman of the Working Group on Dual Use Technology policy for the Office of the Secretary of Defense, a member of the Board of the Arlington Institute, and the Technology Managerial Program Advisory Committee of the Conference Board. He has also been an advisor to the Center for Strategic and International Studies and the Committee for Economic Development; chairman of the National Association of Manufactures Committee on Productivity; a founder and vice president of the American Productivity Management Association; and a member of the U.S. Chamber of Commerce’s Council on Trends and Perspectives. He is also a director of Rentrak, a NASDAQ traded public company.

He holds an undergraduate degree in political science from The Johns Hopkins University and graduate degrees from the London School of Economics (International Law) and Harvard Business School (Business Administration). He has published several dozen papers and books, served on editorial boards of 4 journals, and has lectured extensively in the U.S., Europe and South Africa.

Dale K. Phenicie
Environnemental Affaires Consulting

**Water Policy and Related Environmental Issue
Management Experience**

Dale K. Phenicie is an environmental profession with extensive experience in water policy and related environmental issues management. Throughout his career he has represented industry to successfully resolve complex issues regarding water quality management, water use policy, and water withdrawal regulation. This experience has included: multi-state and bi-national water use regulation policy, multi-state and bi-national wastewater discharge and receiving water quality regulation policy, individual state water policy development, hydroelectric power water use/water quality issues, and permitting at the state and federal levels.

Mr. Phenicie works with multi-stakeholder parties, state and federal governmental agencies, municipal officials, environmental groups, industries, citizen boards and commissions. He is very experienced in stakeholder processes and has provided presentations on what makes them succeed or fail. He has specialized in relating technical and regulatory information to the general public in concise understandable terms. Specific examples include:

Great Lakes Bi-national Water Use Charter Amendments:

Mr. Phenicie participated in a multi-stakeholder process in which the governments of the U.S. Great Lakes States and the Canadian Provinces of Ontario and Quebec, amended an existing Charter delineating water use policy standards within the Great Lakes region. The amendments (known as Charter Annex 2001) set the stage for the development of a Regional compact and bi-national agreement which will address and coordinate water withdrawal and use standards between each of the state, provincial, and federal government agencies. As a representative of the Council of Great Lakes Industries, Mr. Phenicie's role has been to collaborate with governments, environmental groups, and citizen stakeholders in public meetings regarding the development of Annex compact and agreement language, provide information and comments for the effort, and assist in meeting deadlines established by the Council of Great Lakes Governors. Issues involved land owner and surface water use rights under riparian and common law tenants, use registration requirements, system recharge characteristics, water diversions, consumptive uses, watershed improvement requirements, sustainability standards, tracking water use statistics, and out-of-basin export controls. Mr. Phenicie participated in the development and vetting of several case studies involving industrial development ramifications of potential Annex 2001 provisions.

Great Lakes Water Quality Issues:

Mr. Phenicie has worked on numerous Great Lakes water quality issues. Serving as a representative of several industrial organizations, he has participated in multi-stakeholder initiatives to address water quality and toxic pollutant issues on a bi-national (U.S. and Canada), state/provincial, individual Great Lake, and specific site (bay, harbor, river, or local watershed) basis. He serves as member of the State of the Lakes Ecosystem Conference Steering Committee (a multi-stakeholder/intergovernmental group which formally assesses Great Lakes water quality status), special task forces for the International Joint Commission (the intergovernmental body which oversees boundary waters between the U.S. and Canada), and as the project manager for the Council of Great Lakes Industries participation effort in the Great Lakes Binational Toxics Strategy (a U.S. EPA and Environment Canada toxic substances reduction program). His role is to facilitate and coordinate industry stakeholder participation and solicit cooperation between other stakeholder sectors. The boundaries of this work reach far beyond the Great Lakes Region and also involve issues related to long range transport of air borne pollutants. The scope of work also includes sediments and toxic sediment clean-up issues.

Gulf of Mexico Program:

The Gulf of Mexico Program is a multi-agency effort advanced by U.S. EPA to identify and respond to water quality protection needs. The program requires the cooperation of several federal and state agencies, multi-stakeholder panels and committees. Serving as a member of the Gulf of Mexico Program Public Health Committee, Mr. Phenicie's role was to seek and provide information regarding water use, wastewater discharges, and health related studies collected or conducted by industrial organizations. This information was shared and reviewed with the multi-stakeholder participants on the panel.

Georgia Source Water Assessment and Protection Plan:

Mr. Phenicie served as a member of the Georgia Source Water Assessment and Protection Plan Technical and Citizens Advisory Committee. This multi-stakeholder group prepared the Georgia Source Water Assessment and Protection Implementation Plan for Public Drinking Water Sources, and was submitted to U.S. EPA. Serving as the representative for the Georgia Industry Association, he provides industry related information for and comments on plan drafts. He also interfaced with governmental and citizen stakeholders. Issues included: delineation of surface water intake drainage areas and groundwater recharge zones, assessment of potential contaminant sources, susceptibility determinations, distribution of the assessment plan to the public, and coordination efforts with bordering states.

Maine Water Resources Management Board:

Reflecting his experience and expertise in water use issue management, Mr. Phenicie was named as a member of the Maine Water Resources Management Board, by Governor McKernan in 1989. During his 3 year term, serving as a private citizen, Mr. Phenicie assisted this multi-stakeholder group in the assessment of Maine's water withdrawal/use regulatory structure. The group identified issues and needs and produced a report from which legislative and regulatory leaders worked to revise existing water policy. Providing information which could be directly released to the public was a primary requirement of this work.

Background Information

41 years of Forest Products Industry/Chemical Industry/general manufacturing environmental program leadership, regulatory affairs, environmental policy development, issues management, public communication, process technical service, analytical measurement and technical management experience.

Education:

A. A. S. Industrial Chemistry Technology; Ferris State University; Big Rapids, MI
B. S. Pulp and Paper Technology; Western Michigan University; Kalamazoo, MI

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Evelyn Strader, APR
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Rochester Hills, Michigan 48309
248-340-7062
StraderCo@aol.com

Career Summary: Public relations consultant with more than 25 years experience in developing public relations and marketing support programs for businesses, associations and non-profit organizations. Notable specialties include:

- environmental issues management;
- the creation of comprehensive communication programs;
- the development of strategies to understand, attract and retain customers; and,
- the drafting of clear, precise messages from complex issues.

Public Relations Consultant, Strader & Company (1994 – present)

Recent Projects:

Council of Great Lakes Industries, Ann Arbor, Michigan (ongoing)

Extensive consultation with the Council of Great Lakes Industries, a non-profit organization of major U.S. and Canadian businesses in the Great Lakes region that focuses on environmental issues. Work has included:

- Development of a complete communication program including key messages, specialized publications, newsletter, annual report, portable display and web site.
- Specific projects including industry awareness campaigns, collection of industry success stories, survey and analysis of industry environmental management programs and development of industry position statements, and coordinating issue communication campaigns with environmental groups
- Ongoing consultation which includes writing of all publications, writing and review of presentations, speechwriting and development of specialized communications with government, business leaders and citizen environmental groups and working on regional policy issues.

Environmental Affairs Consulting, Peachtree City, Georgia (ongoing)

- Provide writing and editing services for the annual production of an Environmental, Health and Safety Report for a national association.
- Produce summary issue papers on technical issues.

Great Lakes maritime organization (ongoing)

Writing, editing and design of a monthly member newsletter.

Accel Brand Marketing, LLC (ongoing)

Public relations support for product marketing including articles for trade publications.

Portland area software manufacturer (1999 – 2001)

Writing and design of a quarterly customer newsletter.

R. E. Launs Inc. advertising agency, Southfield, Michigan ((1996 -- 1998)

Consultation to provide public relations services to clients including a national homebuilder and a national insurance company. Services included development of communication plans, a promotional campaign to celebrate a corporate anniversary and promotion of company expansion.

Other client projects

Developed a communication plan to raise the visibility of a regional real estate multi-listing service facing competition from other services.

Promoted a non-profit special event fundraiser and developed a program for publicity for future events.

Previous positions:

Detroit/Wayne County Port Authority (1987-1994)

Director of Public Relations

- Directed all the communications for the port facilities and the Greater Detroit Foreign Trade Zone, Inc. which included a complete program to market the trade and transportation services nationally and internationally. Developed a comprehensive package for trade show participation that included theme, booth design, written materials, promotional items and trade show selection. Produced all the written communications designed to attract and retain customers.

Jade/Associates, Inc. Public Relations Agency, Detroit, Michigan

Account Supervisor (1984-1986)

- Created strategic plans and effective communication tools for legal services, health care and mental health services.

Sylvania City Schools, Sylvania, Ohio

Public Information Editor

- Developed communication programs directed at district residents, parents and potential residents.

Other experience: Former newspaper reporter for the *Toledo Blade* in Toledo, Ohio, and college journalism instructor at Owens Technical College, Perrysburg, Ohio.

Education

Graduate, the University of Wisconsin with a BA in Journalism.

Professional Affiliations

- Accredited member of the Public Relations Society of American (APR) since 1989
- Board member, Great Lakes Information Network
- Co-chairman of the Portland Communicators Conference, representing Portland Public Relations Society of America (PRSA) September 1999
- Co-chairman Accreditation Program, PRSA, Detroit Chapter 1992 and 1993

Attachment 6

Project Consultant Profile

LimnoTech

LimnoTech is a water sciences and environmental engineering consulting firm headquartered in Ann Arbor, Michigan. We work with clients across range of sectors to address challenging water resource issues. Our knowledge and experience related to water stewardship and sustainability builds on 35 years of in-depth experience addressing almost every major water issue, including watershed management, wastewater discharges, and impacts of water withdrawals, wet weather challenges, ecosystem restoration, groundwater pollution, eutrophication, toxics, and more.

LimnoTech has conducted several water footprint assessments for clients in the food and beverage industry and for the International Finance Corporation. The most recent water footprint assessment, related to drip irrigation in India, was the first comprehensive assessment that addressed all four phases including the sustainability assessment and response formulation phases. LimnoTech is an active member of the Water Footprint Network and a participant in two technical working groups focused on grey water and the sustainability (impact) assessment methodology.

LimnoTech staff has been trained through the certified course offered by the Water Footprint Network in the Netherlands. We have reviewed numerous published water footprint reports prepared by others and have critically evaluated the Water Footprint Network's methodology. LimnoTech is working collaboratively with the Nature Conservancy (Brian Richter, Director of Global Freshwater Conservation) on many of these projects.

Selected Project Summaries

LimnoTech is currently supporting the water stewardship efforts of several international corporations, many in the food and beverage sector. A few examples of projects involving water footprinting and related activities are summarized below.

Development, Execution, and Documentation of Water Footprint Assessments for Jain Irrigation Systems

As a member of the Water Footprinting Team of the International Finance Corporation (IFC), LimnoTech supported a water footprint initiative with Jain Irrigation in India that allows the company to measure its water footprints and assess the sustainability of its water use. Jain Irrigation has pioneered water conservation and the use of water-saving devices. The final report with a brief summary is available at the following link:

[Jain Water Footprint Assessments - Report \(external\)](#).

Water Footprint Assessment of The Coca-Cola Company's Orange Juice Products

LimnoTech conducted a water footprint assessment for two of Coca-Cola's orange juice products. The work involved collection and synthesis of a significant volume of data and information on Coca-Cola's water use at its plants and a complex supply chain that spans four

countries. The final report was reviewed by a review panel comprised of the Water Footprint Network and others including Brian Richter of The Nature Conservancy. The results were reported and discussed in a recent report issued by The Coca-Cola Company and The Nature Conservancy on the practical application of water footprinting. Wendy Larson of LimnoTech was the primary author. The report is available at the following link:

http://www.thecoca-colacompany.com/presscenter/nr_20100908_water_footprint_report.html

Water Footprint of a Kraft Foods' Dry Mix Beverage Product

LimnoTech and The Nature Conservancy recently conducted a screening-level water footprint analysis for a dry mix beverage product produced in Brazil. The work highlighted that most water consumption is associated with the supply chain and the team is currently working with Kraft to identify measures to improve efficiency measures associated with sugarcane grown in Brazil.

Quantifying Watershed Restoration Benefits in Community Water Partnership Projects

LimnoTech, in collaboration with The Nature Conservancy (TNC), is supporting The Coca-Cola Company's water stewardship initiatives and commitment to its water-neutrality goal set in 2007. This multi-year project is focused on the watershed restoration benefits generated through the Community Water Partnership (CWP) program. This work focuses on the response formulation phase of a water footprint assessment. The most recent report, *Quantifying Watershed Restoration Benefits* is available at the following link:

http://www.thecoca-colacompany.com/citizenship/community_initiatives.html

Key Project Staff

Wendy Larson, Senior Project Scientist

Wendy participated in the certified training course offered by the Water Footprint Network last year. Her academic training is in biology and hydrology, and she brings 23 years of technical experience through project work that spans a broad range of water issues. She recently directed a water footprint assessment of two orange juice products for The Coca-Cola Company and is serving as a water specialist on the Water Footprinting Team of the International Finance Corporation. She is an effective communicator with demonstrated ability to explain complex technical issues in a straightforward manner.

Gregory Peterson, Vice President

As an Environmental Engineer with 26 years of experience, Greg has managed projects at more than 300 sites nationwide. His experience in the industrial sector has included water resource management, hydrogeologic investigations, site assessments, regulatory compliance, facility audits, permit development and review, exposure and risk assessment; and nonpoint source assessment. Greg will serve as project officer and senior reviewer. Greg worked in this role for similar water footprint assessments for the beverage industry and International Finance Corporation.

Joseph V. DePinto, Ph.D., Senior Scientist

Dr. DePinto is a Senior Scientist at LimnoTech. He has 36 years of experience (27 of which have been spent in academia as a Professor of Environmental Engineering) conducting aquatic system research, education and management programs, with an emphasis on activities in the Great Lakes region. Dr. DePinto is currently serving as Principal Investigator for the GLPF funded project: *Development of a Great Lakes Watershed Ecological Sustainability Strategy* and is on the advisory panel for a GLPF-funded project led by Dr. Alex Mayer titled: *Virtual Water Accounting: A New Paradigm for the Adaptive Management of Great Lakes Water*.

Pranesh Selvendiran, Ph.D., Project Engineer

Pranesh is an Environmental Engineer with a doctorate in Civil Engineering. He is experienced in developing and applying watershed and hydrodynamic models and has extensive experience in data analysis and interpretation, database management and development of technical reports. Pranesh calculated the supply chain water footprints for the two orange juice products and is a key team member on Water Footprinting Team of the International Finance Corporation.

Penelope Moskus, Environmental Scientist

Penelope has 16 years of experience conducting watershed and water resource assessments and is skilled at watershed characterization, data analysis, modeling and writing. She was heavily involved with data analysis and water footprint calculation for two orange juice products for The Coca-Cola Company. She is currently assessing trends in water resources, factors driving those trends and implications for the electric power industry.

Attachment 7

Project Consultant Profile

NCASI

The National Council for Air and Stream Improvement (NCASI) is an independent, non-profit research institute that focuses on environmental topics of interest to the forest products industry. NCASI was established in 1943 by the pulp and paper industry to provide technical assistance for the industry's goal of lowering the ecological impact of its spent pulping liquors. In the years since, NCASI has developed technical expertise spanning the spectrum of environmental challenges facing the forest products industry, and is today recognized as the leading source of reliable data on environmental issues affecting this



industry. Through its research investigations, surveys, and other information gathering activities, NCASI helps ensure that environmental decision-making at many different levels is based on technical information of the highest possible quality. NCASI's extensive [research program](#) is funded primarily by annual dues from its member companies, which collectively produce more than 90 percent of the pulp and paper and a sizeable fraction of the wood products manufactured in the United States. [Membership](#) is open to forest products companies in the United States, Canada, and beyond North America. Sustaining Membership is open to suppliers, consulting firms, testing laboratories, and engineering firms allied to the forest products industry.

NCASI maintains a technical staff of approximately 80 scientists and engineers with expertise in areas such as chemistry, chemical engineering, environmental engineering, pulp and paper science, forestry, toxicology, aquatic biology, wildlife biology, forest biology, and computer science. All of NCASI's senior staff hold graduate degrees in their specialty areas.

Research activities are conducted at several [facilities](#) located throughout the United States—three regional centers, two aquatic biology facilities, and numerous forestry-related field study sites. NCASI's headquarters office is located in Research Triangle Park, North Carolina. In 2002, NCASI expanded operations to accommodate the Canadian industry, and opened an office in Montreal.

NCASI distributes a variety of [publications](#), including newsletters, current awareness memos, and handbooks. The results of NCASI's research studies are usually published in the form of Technical Bulletins or Special Reports. While these research results are used extensively within the industry, they also find frequent use among academic researchers, regulatory agencies, and others needing reliable environmental data and information on the forest products industry. NCASI frequently sponsors research projects at universities and other research institutes, and encourages external researchers to publish their work as appropriate in peer-reviewed journals.

NCASI's Mission: To serve the forest products industry as a center of excellence for providing technical information and scientific research needed to achieve the industry's environmental goals and principles.

NCASI's staff is comprised primarily of technical professionals with experience in a wide variety of environmental fields. Currently, about 100 employees work at various locations across the United States and in Montreal. Click [here](#) for a map showing NCASI regional centers and headquarters.

Below is a list of the primary NCASI facilities. Click on a facility name to view details.

◆ Canadian Operations	Montreal, QC	(514) 286-9111
◆ Headquarters	Research Triangle Park, NC	(919) 941-6400
◆ Northern Regional Center	Kalamazoo, MI	(269) 276-3550
◆ Northwest Aquatic Biology Program	Wenatchee, WA	(360) 293-4748
◆ Southeastern Aquatic Biology Program	New Bern, NC	(252) 637-4326
◆ Southern Regional Center	Newberry, FL	(352) 331-1745
◆ Statistics and Model Development Group	Tewksbury, MA	(978) 296-5030
◆ West Coast Regional Center	Corvallis, OR	(541) 752-8801

NCASI's water quality program focuses on the characterization of process wastewaters from forest products manufacturing operations and the environmental significance of their release to surface waters after treatment. Technical study centers around effluent composition, biological treatment, the fate of effluent constituents in receiving waters, the characterization of receiving waters potentially impacted by these operations, and the analytical methods used for measuring constituents in water and associated solids. Most water projects are driven by opportunities to enhance current mill environmental effectiveness, or are developed in response to regulatory activities where the likelihood of sound decisions would be enhanced by an improved understanding of the underlying science. To this end, water program activities are coordinated

with the research efforts of NCASI's Forestry and Ecological Assessment programs as appropriate.

The water quality program focuses specifically on current and near-term future information needs. Investigations related to effluent quality include studies of nutrient use and control in biological treatment systems and the significance of residual nutrient forms in treated effluents; sources and prevention-related control of metals, particularly mercury, in mill wastewaters; the fate and forms of mercury in aerated stabilization basin (ASB) wastewater treatment systems; improving the performance of AOX, phosphorus and other analytical methods when applied to effluents; and modernizing the NCASI ASB model used as an aid to maintaining or enhancing treatment plant performance. Investigations related to surface water quality are typically linked to regulatory programs that target specific stream pollutants occurring at concentrations in excess of desired levels.



The most common such approach used in the US is the TMDL or "total maximum daily load" program. NCASI projects designed to support water quality studies include information gathering and assessment to identify forest products industry involvement in areas where waters have been identified as impacted; studies that enhance the understanding and utility of water quality models used for stream assessment; and evaluation of the appropriateness of newly recommended water quality standards and the potential for forest products industry sources to be impacted by new standards.

The results of NCASI's water quality program are used by individual mills to enhance mill-site environmental programs and to facilitate participation in local or regional water quality improvement initiatives. NCASI information resources are also used by companies and industry trade associations at the local, regional, and national levels to promote sound regulatory decisions based on credible scientific information.