Evaluation Findings

Lake Superior National Estuarine Research Reserve

October 2010 to September 2020

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Summary of Key Findings

The Coastal Zone Management Act requires the National Oceanic and Atmospheric Administration (NOAA) to conduct periodic evaluations of the performance of states and territories with federally approved national estuarine research reserves. This evaluation conducted by the Office for Coastal Management examined the operation and management of the Lake Superior National Estuarine Research Reserve for the period from its designation in October 2010 to September 2020. The evaluation focused on two target areas: program administration and partnerships. The four sectors addressed by all of the national estuarine research reserves are research, training, education, and stewardship.

The findings in this evaluation document will be considered by the NOAA Office for Coastal Management in making future financial award decisions concerning the reserve. The evaluation came to these conclusions:

Accomplishment: The University of Wisconsin-Madison Division of Extension has used innovative mechanisms to both maintain funding and fill a key position during difficult budget periods in the university system.

Accomplishment: The Lake Superior Research Reserve has effectively integrated the research, education, and training programs to deliver a unified approach to providing service to reserve partners and the local community.

Accomplishment: The Lake Superior Research Reserve has worked with its partners to develop facilities that are useful for reserve management and accessible to the public for education and training events.

Accomplishment: The Lake Superior Research Reserve's St. Louis River Summit has become the preeminent event for practitioners concerned with the health of the estuary and larger Lake Superior ecosystem to come together and discuss research, management results, and rising issues.

Accomplishment: The Lake Superior Research Reserve has excelled at working with partners to develop and deliver conferences, workshops, and trainings, and to provide service to the two state coastal management programs.

Accomplishment: The Lake Superior Research Reserve has partnered with local Indigenous communities to design and implement education and training programs that not only serve the local community but that serve to educate others about Ojibwe customs and concerns.

Recommendation: The NOAA Office for Coastal Management recommends that the University of Wisconsin's Natural Resources Institute take steps to ensure that key positions at the Lake Superior Research Reserve remain filled with qualified professionals. This commitment should

include a formal review of reserve hiring procedures, job classifications, and personnel retention incentives.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve continue to examine innovative ways of providing staff support, including seeking opportunities for fellows, interns, and partnerships to help deepen the bench of expertise for rising issues such as climate change and resilience, nature based infrastructure, microplastics, and social science. Skill development opportunities for existing staff could also play an important part in maintaining a highly qualified staff.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve develop a formal cross-sector needs assessment and project prioritization process. A justice, equity, diversity, and inclusion plan could be helpful in this endeavor.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve develop a plan with specific checkpoints to ensure that the reserve's various leases and memorandums of understanding with partners are up to date.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior National Estuarine Research Reserve continue to work with its partners to plan for and construct a dormitory facility for visiting researchers and educators.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve develop an external communications and marketing plan that would help share the reserve's mission and vision, the successes of the sector programs, and partnership opportunities throughout the local community and the broader Lake Superior region.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve consider adopting internal communications and engagement guidelines to empower reserve staff to regularly engage with their peers in the university system, with regional partners, and across NOAA and the National Estuarine Research Reserve System.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Reserve create a position of stewardship coordinator to support and strengthen relationships with landholding partners.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve consider creating methods for engagement with Rivers2Lake participants beyond the one year of intensive training.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve explore additional grant funding outside the education sector.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve initiate a research prioritization process (including basic research), factoring in all of the input from the annual St. Louis River Summit, the Research and Monitoring Advisory Committee, and various working groups, to help staff manage workloads as well as partner expectations, and ensure high quality service without overtaxing staff.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve consider creating methods for engagement with area residents and Indigenous communities to further develop the use of community science and Indigenous knowledge to supplement reserve research and monitoring. This effort could include Rivers2Lake participants who would like to remain involved beyond their one year of intensive training.

Conclusion: This evaluation finds that the University of Wisconsin-Madison Division of Extension is adhering to the programmatic requirements of the National Estuarine Research Reserve System in the operation of the Lake Superior National Estuarine Research Reserve.

Program Review Procedures

The NOAA Office for Coastal Management evaluated the Lake Superior National Estuarine Research Reserve in fiscal year 2020. The evaluation team consisted of Ralph Cantral, evaluation team lead, Heather Stirratt, Great Lakes region coordinator, Jennifer Ballinger, site liaison, Elizabeth Mountz, operations manager, and Kirsten Rhude, John A. Knauss Sea Grant Fellow, all from the NOAA Office for Coastal Management; and Coowe Walker, manager, Kachemak Bay Reserve in Homer, Alaska. The support of the Lake Superior Reserve staff members was crucial in conducting the evaluation, and their support is most gratefully acknowledged.

NOAA sent a notification of the scheduled evaluation to Tricia Gorby, Director of the Natural Resources Institute at the University of Wisconsin-Madison Division of Extension, on February 24, 2020, and published a notice of intent to evaluate the Lake Superior Reserve in the *Federal Register* on July 24, 2020. The Lake Superior Reserve posted a notice of the public meeting and opportunity to comment in the *Superior Telegram* on September 4, 2020.

The evaluation process included a review of relevant documents and a survey of stakeholders, which helped identify two target areas for the evaluation: program administration and partnerships. A virtual site visit was conducted from September 8 through 11, 2020, where the evaluation team held group discussions with stakeholders and program staff members. The evaluation team also discussed the target areas with reserve staff members who helped identify issues and workable solutions to maintain and improve the implementation of the reserve's programs. In addition, a virtual public meeting was held on Wednesday, September 9 at 4:00 p.m. (CDT) to provide an opportunity for members of the public to express their opinions about the implementation of the reserve programs.

Stakeholders and members of the public were also given the opportunity to provide written comments via email or U.S. mail through Friday, September 18, 2020. Several written comments were received from the public or interested parties. Final evaluation findings for all national estuarine research reserves highlight the reserve's accomplishments in the target areas and include recommendations that are of two types:

Necessary Actions address programmatic requirements of the implementing regulations of the Coastal Zone Management Act and of the reserve's management plan approved by NOAA. These must be carried out by the dates specified. Failure to address necessary actions may result in a future finding of non-adherence and the invoking of interim sanctions, as specified in the Coastal Zone Management Act §312(c). This evaluation contains no necessary actions.

Recommendations are actions that the Office for Coastal Management believes would improve the program, but which are not mandatory. The reserve is expected to have considered the recommendations by the time of the next evaluation or by the dates specified. This evaluation contains 12 recommendations.

Evaluation Findings

Target Area 1: Program Administration

The Lake Superior National Estuarine Research Reserve is located in Superior, Wisconsin, on the south shore of Lake Superior. The research reserve encompasses part of the St. Louis River Estuary, at the head of the Great Lakes–St. Lawrence River system, the largest freshwater system in the world. The St. Louis Estuary is a Great Lakes Area of Concern due to historical industrial uses. The reserve is administered by the Natural Resources Institute of the University of Wisconsin-Madison Division of Extension.

Key Findings related to Target Area 1:

Leadership and Staffing

During the evaluation site visit, leadership and staffing were mentioned most frequently by both research reserve staff and their partners. These comments referred to a range of issues, including staff retention, inadequate staffing, and changes in both the leadership at the reserve and management structure in the University of Wisconsin (UW) System.

The research reserve was originally operated by the Environmental Resource Center in the University of Wisconsin-Extension, an arm of the UW System, with grants being administered at the University of Wisconsin-Superior. In 2019, UW-Extension became a component of the University of Wisconsin-Madison, where it is now the Division of Extension. The cooperative agreement for reserve operations is now managed by the Institute for Natural Resources within UW-Madison's Division of Extension. This provides an opportunity for the reserve to work closely with the Research and Sponsored Programs Office at UW-Madison, which has more experience and capabilities for federal grants management. The research reserve continues to work with UW-Superior to provide local infrastructure, including information technology services and collaborative research and education opportunities. Although there have been growing pains during this shift, the research reserve should now be in a better position to attract research interest from the primary research university in the state, UW-Madison.

In 2015, state funding to the entire University of Wisconsin System, including Extension, received significant reductions. The then-configured UW-Extension was able to continue full funding for the state-match research reserve's cooperative agreement despite these reductions. The Coastal Training Program coordinator position was vacant and needed to be filled at the same time as the University of Wisconsin System was reducing its workforce. Extension leadership worked with the reserve manager to advertise the position outside of the normal process, which allowed the position to be advertised and filled. Since these events, UW-Extension underwent a large-scale reorganization, as mentioned above.

Accomplishment: The University of Wisconsin-Madison Division of Extension has used innovative mechanisms to both maintain funding and fill a key position during difficult budget periods in the university system.

Over the course of the evaluation period, two succeeding reserve managers left their positions, giving no notice to the reserve's partners. These departures created uncertainty for the staff and confusion among the partners, including the NOAA Office for Coastal Management. Local partners expressed serious concerns about not receiving any official notification of these changes at the reserve and were disappointed in the lack of information provided by UW–Extension. The partners also expressed their hopes that the university would work to build back a trusting relationship. One partner expressed the view that although having to establish a relationship with a new manager would take effort, the most difficult task would be to rebuild trust between the community and the university.

All of those who offered opinions expressed hope that future decisions by the University of Wisconsin-Madison Division of Extension would not only ensure the hiring and retention of qualified individuals, but also reestablish a trusting relationship with community partners. Division of Extension leadership acknowledged these past difficulties and expressed confidence that placing reserve direction under the Natural Resources Institute had put them in a better position to both oversee staffing at the reserve and build lasting relationships with the reserve's partners. The Office for Coastal Management also expressed concerns about negative impacts to the national reserve system by not having consistent partners at the reserve, emphasizing that reserve leadership has important responsibilities to participate in system-wide programs.

At the time of the evaluation site visit, the manager position was vacant and was once again being advertised to be filled. In discussions with leadership at the UW Division of Extension and Institute for Natural Resources, the evaluation team sought a better understanding of the issues involved with hiring and retaining staff. In response to these concerns, evaluation team members were encouraged to observe and participate in the interview process for the reserve manager position. Three well-qualified professionals were interviewed, and in November 2020, the manager position was filled by promoting the reserve's existing education coordinator. This decision took into account the desire to have leadership that was not only qualified, but invested in the needs of the local community.

Other positions at the reserve have also been difficult to keep staffed. The research coordinator and Coastal Training Program coordinator positions were vacant for significant stretches during the evaluation period. This has meant that other staff members have had to temporarily take on responsibilities that exceeded their job descriptions. At the time of the evaluation site visit, all of the key leadership positions were filled. A water quality monitoring specialist position remains vacant, but the reserve hopes to fill that position as a stewardship coordinator.

Recommendation: The University of Wisconsin's Natural Resources Institute should take steps to ensure that key positions at the Lake Superior Research Reserve remain filled with qualified professionals. This commitment should include a formal review of reserve hiring procedures, job classifications, and personnel retention incentives.

One of the successes of the research reserve has been cross-sector initiatives such as the St. Louis River Summit, the River2Lake Summer Institute, and community events such as River Talks, Lake Superior Day, and National Estuaries Day. Each of these endeavors has required a collaborative approach that builds from the many areas of expertise possessed by individual staff members and has created a unified approach that has received accolades from the reserve's partners.

A key element of the reserve's efforts to integrate across sectors has been peer to peer exchanges with other coastal and estuarine programs, including other research reserves. This approach has created partnerships that allow the reserve to acquire knowledge at a very low cost. A partnership with the He'eia Research Reserve in Hawaii has helped to develop GIS expertise leading to an innovative dynamic site profile. Reserve staff also participate in sector groups with the other 28 reserves in the national system, playing leadership roles on such topics as sentinel site development and oversight of the System-Wide Monitoring Program. The reserve is encouraged to continue to support these types of opportunities through staff exchanges, training, and mentoring options with other programs in Wisconsin, Minnesota, and across the Great Lakes, as well as the National Estuarine Research Reserve System.

Accomplishment: The Lake Superior Research Reserve has effectively integrated the research, education, and training programs to deliver a unified approach to providing service to reserve partners and the local community.

Since the formation of the Natural Resources Institute, steps have been taken to alleviate the lack of staff capacity at the research reserve. In addition to focusing on ensuring that full-time staff positions at the reserve are filled with qualified individuals, portions of the time of several institute employees have been allocated to the research reserve. These employees can provide needed skills that do not require an on-site presence. In addition, the research reserve generally hosts five to six internships at both the graduate and undergraduate levels.

Another issue that was identified during the site visit was the need to either increase staff or lower expectations about what the research reserve can accomplish. As the reserve has shown success in its activities, more expectations have been voiced by partners and other members of the community, causing the reserve to take on or sustain new initiatives. Discussions with reserve staff emphasized that limited staffing levels may not allow the reserve to take on new tasks.

Retention of staff is another issue impacting the research reserve. The reserve manager, Coastal Training Program coordinator, and research coordinator positions have all turned over during the past several years. Maintaining staff morale is important to staff retention, and staff stated that one issue that might be addressed is professional development opportunities. In that regard, the reserve may want to consider creating a professional development plan for each employee. Training opportunities are available through local and statewide universities, as well as from NOAA. A focus on training could help with staff retention and improving opportunities to move up through the reserve system.

Recommendation: The Lake Superior Research Reserve should continue to examine innovative ways of providing staff support, including seeking opportunities for fellows, interns, and partnerships to help deepen the bench of expertise for rising issues such as climate change and resilience, nature based infrastructure, microplastics, and social science. Skill development opportunities for existing staff could also play an important part in maintaining a highly qualified staff.

In light of staffing limitations, it could be helpful to the reserve to undertake an assessment of the needs of the local community with regard to all of the sectors—research, education, and training. The results of this process could then be shared with the Reserve Advisory Board, NOAA, and local partners. This would enable the reserve to be less reactionary, more strategic, and better able to manage partner expectations. The reserve, with its small staff, clearly can't be all things to all people, and a formal process that outlines how priorities will be set and then acted upon will help the reserve manage requests from partners throughout the region.

Recommendation: The Lake Superior Research Reserve should develop a formal cross-sector needs assessment and project prioritization process. A justice, equity, diversity, and inclusion plan could be helpful in this endeavor.

At the present time, the reserve manager is not only responsible for both the leadership of staff and representing the reserve with the university, but also for performing many of the administrative duties associated with the management of the research reserve. This dual focus has made the manager position a difficult one to fill and to retain. The Natural Resources Institute may want to consider adding a deputy manager position or some other mechanism to deal with at least some of the administrative duties. This would free up more of the manager's time to interface with partners and represent the reserve in the community.

Facilities

The Lake Superior Research Reserve offices and laboratory are located on Barker's Island, in Superior, Wisconsin. The buildings are owned and managed by the University of Wisconsin-Superior, on land leased from the City of Superior. The facilities were purchased by UW-Superior using NOAA procurement, acquisition, and construction (PAC) funding, and are leased to the reserve. NOAA funding was also used to renovate the buildings during this evaluation

period. The reserve's offices and laboratory are located in a former restaurant. The Lake Superior Estuarium—an exhibit hall and meeting space—is located in a former tourist facility that also contains an office for a visiting researcher or temporary staff member and an office for the Friends of the Lake Superior Reserve. The University of Wisconsin-Madison Division of Extension provides approximately $30,000 annually to support the facility. Wisconsin Sea Grant has also participated in funding the construction of the reserve offices.

The Estuarium has been very successful in engaging the Superior–Duluth community in the programming of the research reserve. More than 11,000 people have visited the facility since it was opened in September 2017. The Confluence Room has been used for meetings by more than 200 community groups.

The Lake Superior Research Reserve has also recently received NOAA PAC funding to improve access to the Pokegama River, a tributary to the estuary and a central location for water access within the reserve. Community member and partner involvement were central to the design of this facility that will improve access for education, research, and monitoring. The reserve has also been supportive of access improvements on adjacent lands, including the restoration of Wisconsin Point at the mouth of the estuary, which was accomplished through Great Lakes Restoration Initiative funding in partnership with the Wisconsin Coastal Management Program.

Accomplishment: The Lake Superior Research Reserve has worked with its partners to develop facilities that are useful for reserve management and accessible to the public for education and training events.

The Lake Superior Reserve has a variety of agreements with partners that are related to a number of topics from research to education to facilities. Two agreements that were discussed were a memorandum of agreement to provide space in the Estuarium to the Friends of the Lake Superior Reserve and the vessel agreement with the NOAA Great Lakes Small Boat Program.

Recommendation: The Lake Superior Research Reserve should develop a plan with specific checkpoints to ensure that the reserve's various leases and memorandums of understanding with partners are up to date.

The evaluation team learned that one factor discouraging use of the research reserve by researchers and educators is the lack of dormitory space to accommodate researchers from other colleges. The reserve conducted a stakeholder input process in 2018-2019. The reserve and its partners are discussing how such facilities might be funded.

Recommendation: The Office for Coastal Management recommends that the Lake Superior National Estuarine Research Reserve continue to work with its partners to plan for and construct a dormitory facility for visiting researchers and educators.

Communications (Internal and External)

The evaluation team learned that communications has been an issue for both Lake Superior National Estuarine Research Reserve staff and partners. Specific examples included the lack of knowledge in the community regarding the departure of reserve staff and members of the reserve staff feeling that they did not have clear channels of communication with leadership at the universities and with counterparts at NOAA. Another communication concern mentioned frequently was the lack of knowledge of the importance of the reserve in the broader community. As an example, partners felt that the reserve did not take enough credit that they are the conveners of the very popular St. Louis River Summit.

The Natural Resources Institute has taken steps to address communications issues by providing additional staff related to both outreach and graphic design. Shared positions have been created for both of these activities, with outreach being provided by staff co-located with the Lake Superior Collaborative and graphic design from the institute's offices in Madison.

Educating the general public about the importance of the research reserve was also recognized as an issue. The need to focus on messaging to diverse audiences was pointed out as a key need for the research reserve. The reserve's education and training programs have included Ojibwe community representatives as both advisors and target audiences, and it was felt that further outreach to these communities would help the reserve provide more service to the community.

Recommendation: The Office for Coastal Management recommends that the Lake Superior Research Reserve develop an external communications and marketing plan that would help share the reserve's mission and vision, the successes of the sector programs, and partnership opportunities throughout the local community and the broader Lake Superior region.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve consider adopting internal communications and engagement guidelines to empower reserve staff to regularly engage with their peers in the university system, with regional partners, and across NOAA and the National Estuarine Research Reserve System.

Target Area 2: Partnerships

Key Findings Related to Target Area 2:

The Lake Superior Reserve has developed a number of partnerships that expand its influence throughout the community and the Lake Superior region. Perhaps the biggest partnership of the research reserve is the St. Louis River Summit. This annual event has become the biggest

opportunity for the reserve to interact with the research, education, and resource management community. The summit is now in its eleventh year and draws more than 300 participants from the region. All sectors of the reserve are involved in developing and conducting this signature event.

Accomplishment: The Lake Superior Research Reserve's St. Louis River Summit has become the preeminent event for practitioners concerned with the health of the estuary and larger Lake Superior ecosystem to come together and discuss research, management results, and rising issues.

Resource Management

The Reserve Advisory Board for the Lake Superior Research Reserve brings many of the partners together through regularly scheduled meetings. The majority of the members are resource management agencies that help the reserve focus on the need for research, education, and training, but that also can apply the results of the reserve's efforts. The advisory board includes representatives from both Wisconsin and Minnesota coastal programs as well as other agencies, in addition to local government and Ojibwe representation.

The research reserve has worked with local resource managers to conduct workshops to share information leading to improved resource management. Good examples of this are the Highs and Lows Conference, examining water levels in Lake Superior and its impact on community resources, and the Blooms and the Big Lake Workshop, which examined the state of knowledge of algal blooms in Lake Superior. The reserve partnered with state and federal agencies, tribal government, and local government to develop and conduct these events.

Stewardship of land and water resources within the reserve has also been seen as a rising need. At the time of the evaluation site visit, the reserve planned to convert a vacant position of monitoring technician to a stewardship coordinator. This could be very helpful to coordinate the efforts of the various partners—including the City of Superior, Douglas County, and the Wisconsin Department of Natural Resources—that own the land within the reserve.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Reserve create a position of stewardship coordinator to support and strengthen relationships with landholding partners.

Education and Training

The research reserve has been quite successful in training teachers in the Superior–Duluth area through the Rivers2Lake program. This program, developed with the University of Wisconsin-Superior, is supported by a number of reserve partners, including the Great Lakes Aquarium, Fond du Lac Band of Lake Superior Chippewa (Ojibwe) Resource Management Division, National Park Service, Superior School District, and both Wisconsin and Minnesota Sea Grant programs. The Rivers2Lake program is a yearlong professional development experience for

teachers that brings them to the reserve to examine the estuarine environment from a variety of disciplines, including geography, biology, geology, economics, and human culture.

In cooperation with municipal governments in the Superior–Duluth area, the reserve's Coastal Training Program has supported and enhanced practitioner trainings (such as the City of Superior's Stormwater Contractor events that focus on reduction of pollutants to Lake Superior). One of the program's newer focus areas of training and outreach has been to emphasize the negative impacts of public-road and private-property de-icing efforts on the estuary and larger Lake Superior ecosystem.

The Lake Superior Research Reserve has also worked to assist both the Wisconsin Coastal Management Program and the Minnesota Lake Superior Coastal Program by providing relevant education and training opportunities. The Highs and Lows Conference was a very successful example. Reserve staff provided assistance that took the burden off of state coastal staff and expanded the reach of participation as a result of their involvement.

Accomplishment: The Lake Superior Research Reserve has excelled at working with partners to develop and deliver conferences, workshops, and trainings, and to provide service to the two state coastal management programs.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve consider creating methods for engagement with Rivers2Lake participants beyond the one year of intensive training.

Many of the education and training initiatives of the research reserve, including Rivers2Lake and the Lake Superior Estuarium, have intentionally focused on protecting resources that are important to the Indigenous culture of the area. The reserve partnered with the Fond du Lac Band of Lake Superior Chippewa (Ojibwe) in the development and delivery of the Rivers2Lake teacher training programs, in conducting the Wild About Rice Festival, and in developing displays at the Estuarium. The reserve had also focused sessions of River Talks—the reserve's public education program—on protecting wild rice in the estuary.

Accomplishment: The Lake Superior Research Reserve has partnered with local Indigenous communities to design and implement education and training programs that not only serve the local community but that serve to educate others about Ojibwe customs and concerns.

The Lake Superior Research Reserve education program has been very successful in securing outside funding. Over the past nine years, the program has received grants from a variety of partners, including the Wisconsin Coastal Management Program, Wisconsin Sea Grant, and the Great Lakes Restoration Initiative, totaling more than $1 million. Now that the reserve management is coordinated through the University of Wisconsin-Madison, the state's land

grant university and a Tier 1 research institution, opportunities for additional funding may be available.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve explore additional grant funding outside the education sector.

Research

Much of the research at the Lake Superior Reserve has been focused on water quality, as the St. Louis River estuary has a history of environmental degradation due to the presence of a number of heavy industries within the estuary. The estuary is listed as an Area of Concern by the Environmental Protection Agency. In an effort to delist the estuary, the reserve has worked in close partnership with the EPA, NOAA's National Marine Fisheries Service, and the Wisconsin and Minnesota Coastal Zone Management Programs to undertake restoration projects in the estuary. The reserve's research program has contributed heavily to the delisting efforts and provided key input on the current St. Louis River Remedial Action Plan.

The Lake Superior Reserve also partnered with NOAA, the Great Lakes Indian Fish and Wildlife Commission, the states of Wisconsin, Minnesota, and Michigan, and several Tribal Nations to study wild rice (manoomin) culture in the Lake Superior basin. The collaborative manoomin restoration initiatives in the St. Louis River estuary positioned the research reserve to participate in this important project..

The research program has also needed to refocus efforts quickly to help partners monitor and better understand emergencies such as the fire at a refinery in the estuary and the unprecedented flooding in the area of the reserve. While severe flooding had previously occurred in 2012 and 2016, the fire occurred during the flooding in 2018, stretching the capacity of the reserve staff. In the case of the refinery fire, the reserve responded within hours by moving water sampling equipment closer to the refinery site. In partnership with Wisconsin Sea Grant, the reserve had the samples analyzed for the presence of polyfluoroalkyl substances (PFASs), chemicals used in firefighting surfactants that have been shown to be hazardous to human health and the environment. The information collected by the research reserve can be used by land managers and disaster response planners throughout the region.

The research reserve works to attract researchers from a variety of higher education institutions. As mentioned previously, the fact that the management of the reserve is now through the University of Wisconsin-Madison, a Tier 1 research university, new partnerships should be forthcoming. Several reserve partners commented that they believe a key goal for research at the reserve at this point should be to encourage basic research.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve initiate a research prioritization process (including basic research), factoring in all of the input from the annual St. Louis River Summit, the Research and

Monitoring Advisory Committee, and various working groups, to help staff manage workloads as well as partner expectations, and ensure high quality service without overtaxing staff.

Recommendation: The NOAA Office for Coastal Management recommends that the Lake Superior Research Reserve consider creating methods for engagement with area residents and Indigenous communities to further develop the use of community science and Indigenous knowledge to supplement reserve research and monitoring. This effort could include Rivers2Lake participants who would like to remain involved beyond their one year of intensive training.

Implementation of General Requirements

The draft management plan for Lake Superior National Estuarine Research Reserve, 2020-2025, has been submitted to the NOAA Office for Coastal Management for review and public comment. As of the date of these findings, the public comments have been addressed and the plan is in the final stages of approval.

Research

The monitoring work being conducted at the Lake Superior Research Reserve is recognized as essential to maintaining ecosystem health and water quality by the reserve's partners. Work that the reserve did to monitor PFASs in support of water quality agencies after the refinery fire in April 2018 was exceptional. This work provided support for efforts in the state to establish new protocols for monitoring PFASs statewide, as well as establish a new lab in the northern part of the state. Wisconsin Sea Grant, working with data collected by the research reserve, was instrumental in getting the new lab certified.

Education

The education programs of the research reserve have been very successful in providing professional development and mentoring to teachers to train students, as well as to directly encourage student exploration of the reserve. The efforts of the education sector have clearly recognized the importance of including participation of local Ojibwe groups in the design and delivery of educational opportunities.

Training

The Coastal Training Program has been quite successful in identifying topics that can be readily used by residents of the Superior–Duluth area. The annual St. Louis River Summit is a major annual event that has been developed and nurtured by the reserve. The Highs and Lows Conference was another well received effort that brought experts together to share best available information about lake levels.

Stewardship

Although the lands included within the research reserve are not managed by reserve staff, the staff actively work with the landowners and users to make improvements. One such improvement during the evaluation period was the Pokegama boat launch. This new facility allows access to the reserve and includes bathrooms, a launch, parking spots, and low impact development road improvements. As mentioned previously, the reserve is seeking to convert an existing position to serve as stewardship coordinator.

Evaluation Metrics

Beginning in 2012, national estuarine research reserves began tracking their success in addressing three evaluation metrics specific to their programs. The evaluation metrics include a five-year target and provide a quantitative reference for each program about how well it is meeting the goals and objectives it has identified as important to the program.

Goals and objectives are from the Lake Superior Reserve Evaluation Metrics approved January 7, 2020.

2017-2022 METRIC 1: Education

Lake Superior Reserve Management Goal V: The Schools and Community Model Collaboration: Educational programming and communication strategies serve as a model for how to effectively engage learners and integrate research to raise awareness of watershed issues.

Lake Superior Reserve Education Objective 1: Use place-based and outdoor learning to support schools, educators, and youth in learning about and experiencing Lake Superior and its estuaries, increasing academic engagement, stewardship and a sense of place.

Lake Superior Reserve Education Strategies:

- Build and strengthen connections between non-formal educators, natural resource managers, tribal entities, scientists and the formal education community.
- Broaden and expand mentoring and relationship building in schools in support of Lake Superior watershed learning.

Strategy Description: Through the work of the Reserve, the research community is engaged with the education community. Residents in western Lake Superior know about the Reserve and Rivers2Lake, increasing participation annually. Both residents and educators come to rely upon the Reserve and the Rivers2Lake program, further reinforcing interest in participation in the Reserve's education programs. Through the application of social science information, the quality of learning through the Reserve's place-based educational programming is improved. This improved learning ultimately leads to the community embracing resilience planning and policies while strengthening community and sense of place.

The Rivers2Lake education program combines TOTE and KEEP programming at the Lake Superior Reserve. In Rivers2Lake, the education coordinator and education staff use a mentoring model, working with teachers and their students monthly over the course of a year to incorporate Lake Superior and outdoor learning into classrooms. The intent of the program is to permanently integrate place-based and inquiry-based learning into teaching practice, and ultimately to improve scientific literacy in Lake Superior's coastal communities. Working with students over the course of the year often results in accumulated contact hours per student. Contact hours may therefore function as a proxy for teacher commitment to the program and as a measure of impact on student learning. Through focused interactions with teachers and their students and complete collection of contact hour data, we propose a goal of a 10% increase in total P-12 contact hours from our previous four-year average of 7,647. In

FY12, the reserve focused on student education and did not have the high quality teacher trainings it currently operates and therefore the contact numbers in FY12 were significantly higher.

Performance Measure: By 2022, the percentage increase of P-12 student contact hours with Reserve education programing, over a four-year baseline.

Target: By 2022, 10% increase in P-12 student contact hours with Reserve education programing, a four-year baseline of 7,647 contact hours will increase to 8412 contact hours (per year).

First Year Results: 7,330

Second Year Results: 11,148

Third Year Results: NA

Fourth Year Results: NA

Fifth Year Results: NA

Cumulative Results: 18,478

Discussion: After two years, the research reserve is exceeding the target.

2017-2022 METRIC 2: Training

Reserve Management Goal II: A Strengthened Community and Sense of Place: Members of the community develop a strong sense of place, based on the ecological, social, cultural and economic values of the Lake Superior watershed.

Objective: Lake Superior coastal communities have increased their capacity to manage hazards and are planning for uncertain future conditions.

Strategy: Facilitate trainings, planning efforts, and cross-jurisdictional conversations that directly relate to resilience building at a regional scale.

Strategy Description: Great Lakes coastal communities face new risks and hazards in a changing climate. The Coastal Training Program (CTP) will prioritize climate change response and regional resilience building at the core of its programming, complementing efforts undertaken by the Reserve's education and research programs. The CTP will provide structured opportunities that bring decision-makers together from the Twin Ports area and surrounding coastal communities around issues relating to climate change and its implications for Lake Superior communities, emphasizing the importance of regional collaboration and learning. CTP will partner with agencies and initiatives already reaching a regional audience as well as looking for unique opportunities to bring diverse professional audiences

together to discuss common resilience concerns. In addition to sharing science-based information about climatic trends and coastal hazards, CTP will offer skill-building training in the critical arenas of risk communication and stakeholder facilitation, underscoring the importance of applying effective communication strategies when addressing the complexity of climate change challenges at the personto-person level. CTP will support an increase in social science and monitoring of social indicators which may offer insights into community vulnerability and resilience priorities.

Performance Measure: From 2017 to 2022, number of trainings delivered through the Coastal Training Program addressing NERRS priority issue "Changing Climate."

Target: From 2017 to 2022, 8 trainings delivered through the Coastal Training Program addressing NERRS priority issue "Changing Climate."

First Year Results: 0

Second Year Results: 5

Third Year Results: NA

Fourth Year Results: NA

Fifth Year Results: NA

Cumulative Results: 5

Discussion: After two years, the research reserve is on track to meet or exceed the target.

2017-2022 METRIC 3: Research

Management Plan Goal 1: A Healthy Lake Superior: Reserve science and collaborations inform management and policy decisions that lead to healthy estuaries and a healthy Lake Superior.

Objective: Lead and facilitate research projects that directly support managers and researchers, improving the ecological condition of Lake Superior estuaries and strength of communities along the coast.

Strategy: Conduct research and assist with research projects that target the information needs of local natural resource decision makers.

Strategy Description: The Reserve supports collaboration between researchers and managers, which leads to improved understanding of available information and data needs. By addressing data and information needs the Reserve supports management and policy decisions leading to habitat restoration and protection. The Research Program will identify information gaps through interactions with natural

resource managers (St. Louis River Estuary Summit, SLRE Habitat Work Group, Reserve and Research Advisory Boards, etc.), as well as through a targeted needs assessment scheduled to be conducted during the early portion of this measurement period. In addition, other research needs are likely to be identified through the St. Louis River Area of Concern (AOC) Remedial Action Planning Process, a systematic and comprehensive ecosystem approach to address beneficial use impairments in the estuary. While the Reserve is not leading the AOC Remedial Action Plan, Reserve staff partner in delisting activities.

The Research Program will select a subset of these gaps and develop NERR-led research projects to collect the needed information and disseminate to researchers and managers. The Research Program will also assist other researchers who are working within the Mission of the Reserve, prioritizing projects that meet the information needs described above. Finally, the Research Program will support collaborative graduate research through the Margaret A. Davidson Fellowship and other programs such as the Lake Superior Freshwater Fellowship Program. The target is set lower than the previous five-year total of 16 new research projects as the reserve was without a research coordinator for over a year and brought a new research coordinator on board in late 2019.

Note: The research program tracks performance measures by calendar, not cooperative grant cycle.

Performance Measure: From 2018 to 2022, the number of new Reserve-led and Reserve-assisted research projects.

Target: From 2018 to 2022, 12 new Reserve-led and Reserve-assisted research projects.

First Year Results: 6

Second Year Results: 0

Third Year Results: NA

Fourth Year Results: NA

Fifth Year Results: NA

Cumulative Results: 6

Discussion: After two years, the research reserve is on track to meet or exceed the target.

2012-2017 METRIC 1: Public education

Goal: Educate youth, students, community members, and visitors about Lake Superior freshwater estuarine and coastal resources and improve their ability to address coastal issues.

Objective: By 2017, the Lake Superior Visitor Center serves as a community resource and leads to increased public awareness of the ecological and cultural significance of the St. Louis River Freshwater Estuary.

Strategy: The Lake Superior Reserve Visitor Center will be open and operational by June 2014. The Reserve will provide programming and exhibits to attract visitors to the Reserve and increase public awareness. It is anticipated that 7,000 visitors will visit during the first 12 months of operation and visitation will increase 10 percent each year through 2017 through increased word of mouth, advertising and educational/scientific programming. [Please see the Education Strategic Plan for more details on the Reserve's strategies for increasing on-site educational opportunities and increasing public awareness.]

Performance Measure: Participants reached through public outreach activities.

Target: Between 2012 and 2017, 33,487 participants reached through public outreach activities.

Cumulative Results: 33,487

Discussion: The LSNERR visitor center was under construction during the initial years of the measurement period, which meant that the reserve could not establish a useful target for the five-year period. The cumulative results indicate that the initial estimate of visitor center usage was low. The evaluation team learned that the reserve has been quite successful in providing education and outreach to the community.

2012 – 2017 METRIC 2: Training

Goal*:* Increase the ability of community leaders and other decision makers to address critical Lake Superior coastal management issues.

Objective: By 2017, provide research-based education outreach programming and skills training that address the Lake Superior coastal management issues and needs of community leaders and other decision makers.

Strategy: The Lake Superior NERR will synthesize, interpret and make available research on economic benefits, ecosystem services, and environmental and social values of Great Lakes water quality and coastal resources. This information will be made available to diverse audiences through the website, factsheets, audio-visual products and lecture series. The Reserve plans to complete a combination of 10 outreach events hosted or publications developed in 2012 and to increase this annually by 1 per year. In the second year a combination of 11 events will hosted or publications developed, the third year 12, the fourth year 13, and the fifth year 14.

Performance Measure: Number of outreach events or publications developed and led by Lake Superior NERR Staff related to sharing research on economic benefits, ecosystem services and environmental and social values of Great Lakes water quality and coastal resources.

Target: Between 2012 and 2017, 60 outreach events or publications are developed and led annually by Lake Superior NERR staff related to sharing research on economic benefits, ecosystem services and environmental and social values of Great Lakes water quality and coastal resources.

First Year Results: No data

Second Year Results: No data

Third Year Results: No data

Fourth Year Results: No data

Fifth Year: No data

Cumulative: 29 training events and publications.

Discussion: While evaluation measure data was incomplete, system records indicate that the reserve has completed at least 29 events or publications. The research reserve did not consistently report on this statistic over the target period, at least partially due to the fact that both the research coordinator and the coastal training coordinator positions were vacant for a significant portion of the period.

2012 – 2017 METRIC 3: Research

Goal: Conduct applied research and monitoring to increase the understanding of Lake Superior freshwater estuaries and coastal ecosystems.

Objective: By 2017, improve the understanding of the St. Louis River Freshwater Estuary, its interactions with Lake Superior and the short- and long-term ecological changes within Lake Superior freshwater estuaries and coastal ecosystems.

Strategy: The Reserve will establish monitoring and field research areas according to the Lake Superior NERR research needs established in the research strategic plan. Monitoring and field research areas will meet the parameters of the NERRS System Wide Monitoring Protocols and/or NOAA Sentinel Site Program.

Performance Measure: Number of sites established and used as intensive monitoring and field research areas.

Target: By 2017, three sites are established and used as intensive monitoring and field research areas.

First Year Results: 4

Second Year Results: 4

Third Year Results: 0

Fourth Year Results: 0

Fifth Year Results: 0

Cumulative Results: 8 (exceeded targets)

Discussion: The reserve exceeded the target for research field sites, despite that fact that the research coordinator position was unfilled for a portion of the target period.

Conclusion

For the reasons stated herein, I find that the University of Wisconsin Division of Extension's operation and management of the Lake Superior National Estuarine Research Reserve, including education, research, and interpretative activities, is adhering to the programmatic requirements of the Coastal Zone Management Act and its implementing regulations.

These evaluation findings contain 12 recommendations that must be considered before the next regularly scheduled program evaluation but that are not mandatory at this time. Recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

This is a programmatic evaluation of the Lake Superior National Estuarine Research Reserve, which may have implications regarding future financial assistance awards. However, it does not make any judgment about or replace any financial audits.

signed by Keelin Kuipers

Keelin S. Kuipers
Deputy Director
NOAA Office for Coastal Management

dated April 21, 2021

Date

Appendix A: Response to Written Comments

Three written comments were received during the public comment period.

Richard Axler, Ph.D., retired limnologist from the Natural Resources Research Institute at the University of Minnesota-Duluth, commented that he fully supports the Lake Superior Research Reserve and related his involvement with the reserve since its inception. One recommendation that he offered was that he fully supports the inclusion of social science research at the reserve. He also expressed the hope that the reserve research staff would stabilize, as the reserve has been hampered by the loss of key staff members.

The evaluation team thanks Dr. Axler for his helpful comments.

Mr. Craig Sterle, former Minnesota Division president, Izaak Walton League, commented that he believes the Lake Superior Research Reserve may want to partner with the Izaak Walton League to initiate a citizen water quality program.

The evaluation team thanks Mr. Sterle for his comments and has shared Mr. Sterle's comments with the research reserve.

David A. Hart, Ph.D., AICP, assistant director for Extension at Wisconsin Sea Grant, offered several examples of partnerships between the research reserve and Wisconsin Sea Grant and expressed strong support for more partnerships with the reserve in the future.

The evaluation team thanks Dr. Hart for his comments.