Sleeping Bear Dunes
Bay to Bay Hiking and Kayaking Trail

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ABSTRACT

The Bay to Bay Trail Masters Project focused on the planning of a 35 mile hiking and paddling trail along the shoreline of Sleeping Bear Dunes National Lakeshore. The Bay to Bay Trail is named such because it would extend from Good Harbor Bay south to Platte Bay. The project was sponsored by the Rivers, Trails, and Conservation Assistance Michigan Office of the National Park Service and The Friends of Sleeping Bear Dunes. The team's process included research into similar trails, field investigations and analyses, and development of a conceptual design for the trail that includes alternative trail routes, campgrounds, and kayak launch sites. The team gauged interest in the trail and gathered input through interviews with local outfitters and user groups. In addition, perspectives on paddlers' and hikers' preferences on trail qualities and amenities were gathered through a set of surveys. Finally, a campground matrix was created to assess and evaluate potential campground sites along the trail. The team's survey and interview findings, maps of trail, campground, and launch site alternatives will be used in the Environmental Assessment of the trail. The water trail and kayak launch site data and analysis will directly benefit Michigan's contribution to the Lake Michigan Water Trail: a four-state effort to create a contiguous water trail around the perimeter of Lake Michigan. Conceptual designs of the campgrounds, launch sites, and trail signage will be used in public meetings. Additionally, the team created mock-ups for a website and brochure to be used by Friends of Sleeping Bear Dunes and the Park. In sum, the project will aid in the actualization of a dual water/hiking trail: an unprecedented recreational feature in Michigan.

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I

Project History and Overview

The Bay to Bay hiking trail existed as a conversation topic among the rangers of Sleeping Bear Dunes since the early days of the Park in the 1970s. The concept of a trail paralleling the lakeshore seemed like a logical addition to the Park given the importance of the lakeshore as an attractive amenity and precedents of other shoreline trails such as the Lakeshore Trail of Pictured Rocks. In 2000, Chief Ranger, Roger Moder, decided that the trail would be a good project for the Ranger Division to move forward on. It was then that rangers Tom Van Zoeren and Jim Dal Sasso began planning a proposed route. The name of the trail, developed by the rangers in a planning session, comes from its span from Good Harbor Bay in the north to Platte Bay in the south. The initial concept of the water trail component came along soon afterwards. Kayakers were being figured into the equation of determining potential campground locations for the trail[1], but the water trail idea didn't take off in full force until a meeting regarding the Lake Michigan Water Trail in 2011.[2]

In the following years, the Bay to Bay Trail idea gained the interest and support of the public and The Friends of Sleeping Bear Dunes. The Friends of Sleeping Bear Dunes (hereafter referred to as Friends) is a nonprofit that was formed in 1994 by a group of individuals interested in supporting the National Park Service's work in protecting natural and historic resources and improving visitors' experiences at Sleeping Bear Dunes. Today Friends is composed of volunteers who work to plan, manage, and fund projects within the park.[3] As Friends began planning work on the trail project, they approached Barbara Nelson-Jameson of the National Park Service's Rivers, Trails, and Conservation Assistance program (RTCA) Michigan Office for assistance. Shortly afterwards, the U of M team came on board to the project.

The U of M Bay to Bay Trail Masters Project began in fall of 2012 from a networking connection between team member Emily Lauderdale and Barbara, an SNRE alumna. Emily got in touch via a mutual contact, Meredith Speicher, from the Hawaii RTCA office. Barbara and Emily discussed the potential of current and future projects being assisted by RTCA across Michigan for potential masters project ideas. The Bay to Bay Trail project in Sleeping Bear Dunes National Lakeshore seemed to have the most potential as a capstone project and was selected for project proposal development.

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[1] Tom Van Zoeren, Friends of Sleeping Bear Dunes volunteer, email message to U of M Team, March 7, 2014.

[2] Barbara Nelson-Jameson, NPS-RTCA, email message to U of M Team, March 10, 2014.

[3] Friends of Sleeping Bear Dunes, About Us. http://friendsofsleepingbear.org/about-us/.

During the winter of 2013, the project team prepared a proposal for the Bay to Bay Trail Masters Project in the School of Natural Resources and Environment. The team consisted of Conservation Ecology students, Han-Yu Chan and Sachin Shahria and Landscape Architecture students, Emily Lauderdale, Shuting Wang, and Fei Zhao. The academic tracks and personal backgrounds of the team members provided a broad array of skill sets that benefitted different parts of the project. Landscape Architecture professor and director of the Nichols Arboretum and Matthaei Botanical Gardens, Bob Grese, filled the role of project advisor. Bob's knowledge of work within the National Parks and past experience advising similar projects made him an excellent mentor and resource for the team.

The Bay to Bay Trail project was for the benefit of three clients: the National Park Service's RTCA Michigan Office as the primary and Sleeping Bear Dunes National Lakeshore and The Friends of Sleeping Bear Dunes as secondary clients. Fieldwork, research, analysis, and conceptual design work completed as part of the project will primarily benefit the Environmental Assessment (EA) currently being conducted for the trail through the Park Service. The National Environmental Policy Act (NEPA) of 1969 has been immersed into the National Park Service's planning process in order to support environmentally sound planning and decision making.[4] The National Park Service has developed a 10-step analysis process to incorporate NEPA into planning:

1. Identify the purpose, need, and objectives of the action
2. Internal scoping, develop a proposal for the action
3. Determine whether a Categorical Exclusion (CE), Environmental Assessment (EA), or Environmental Impact Statement (EIS) is appropriate
4. Develop alternatives, public scoping*
5. Bound analysis
6. Describe affected environments
7. Analyze impacts of alternatives
8. Revise alternatives
9. Document analysis
10. Decision[5]

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[4] National Park Service, Department of the Interior. Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making Handbook, 2001, Sect. 2.1.

* The majority of the B2B Trail masters project contributed to this step

[5] Ibid., Sect. 2.0.

The EA process was originally developed to help determine whether a proposed action would have significant environmental impacts. Today the EA has grown to be a valuable planning tool in itself. Its purposes are to first provide analysis and evidence to support filing a Finding of No Significant Impact (FONSI) or preparing an Environmental Impact Statement (EIS).[6] An EIS is required if the park is planning for an action with potentially significant environmental impacts.[7] Conducting an EA also ensures NEPA compliance when an EIS is unnecessary and aids in preparing an EIS if deemed appropriate.[8]

An EA Kickoff meeting was held in Sleeping Bear Dunes on January 14, 2014, in which the team participated via conference call. It is expected that a FONSI will be filed as a result of the EA, and the process is estimated to take approximately one year.

The first question upon which the Bay to Bay Trail project is centered is 'why construct the trail?' This question remained a focal point as the team contributed to the EA process and began to consider the ecological consequences of developing the trail. The primary arguments supporting a trail came from the General Management Plan (GMP), the general increase in popularity of outdoor recreational activities associated with a hiking/water trail, and the development of the Lake Michigan Water Trail.

GMPs are 20-year plans that are required of each unit within the national park system. The goal of the plan is to provide a holistic assessment and guidance on preserving natural systems, cultural resources, and enhancing visitor experiences.[9] The current GMP for Sleeping Bear Dunes, published in 2009, provides a succinct reference to a lakeshore trail in the Park. In the context of enhancing visitor experiences and showcasing one of the primary natural features of the park, Lake Michigan, the GMP supports the idea of establishing the trail: "A "bay-to-bay" trail for hikers and Lake Michigan paddlers will parallel the mainland shoreline within the Lakeshore; on land, this trail will make use of active beach areas or existing disturbed areas and corridors to the extent possible."[10]

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[6] Ibid., Sect. 5.1.

[7] Ibid., Sect. 4.1.

[8] Ibid., Sect. 5.1.

[9] National Park Service, Department of the Interior, Sleeping Bear Dunes National Lakeshore General Management Plan/Wilderness Study Summary, 2009, 4.

[10] National Park Service, Sleeping Bear Dunes National Lakeshore General Management Plan/Wilderness Study Summary, 44.

The GMP's initiative in developing a hiking/paddling trail is on par with current trends in America's demand for outdoor recreational opportunities. According to The Outdoor Foundation's Outdoor Participation Report of 2013, approximately 142 million Americans participated in some form of outdoor recreation in the past year. This figure is up by 800,000 since 2011.[11] Running (including trail running) was found to be the most popular activity in terms of numbers of participants and total annual outings.[12] Hiking was ranked the 5th most popular outdoor activity by both participation rate and frequency of participation[13]and stand up paddling (SUP) had the highest number of new participants in 2013.[14]

These findings are significant because they show that the recreational opportunities supported by the trail would be in sync with current trends. Although trail running and SUP may not be the signature activities of the trail, they illustrate an important note about the trail's multi-use character. Increasing the number of trails within the Park allows for activities outside of multi-day hiking excursions. Trail running, day-hikes, dog walking, short strolls, and cross-country skiing are all potential activities that would benefit from additional trails. SUP is gaining in popularity in the Midwest and specifically around Sleeping Bear Dunes. By providing better access to calm pockets of Lake Michigan where kayak launch points may be sited and developing trails that would increases access to inland lakes, the Bay to Bay Trail would help support the development and popularity of this sport. It is critical to consider 'secondary' activities on the trail outside of hiking and kayaking. Providing for more than two activities not only furthers the justification for the trail, but it also makes the trail sustainable in the long run. As recreational trends change, the Park and local outfitters will find themselves catering to different activities. A multi-use trail boosts Sleeping Bear Dunes' adaptability to the dynamic demands for recreational opportunities.

In addition to providing for recreational trends, the water trail would directly benefit the development of the Lake Michigan Water Trail, a four state effort to create a contiguous trail around the perimeter of the lake. Once completed, the trail will be the longest contiguous loop freshwater sea kayaking trail in the world. The trail will provide unique and diverse experiences by allowing access to dense urban areas along Chicago's lakefront as well as scenic landscapes rich with natural history along the Indiana Dunes and Sleeping Bear Dunes lakeshores.[15]

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[11] The Outdoor Foundation, Outdoor Participation Report 2013, 4.

[12] Ibid., 5.

[13] Ibid., 17.

[14] Ibid., 5.

[15] Lake Michigan Water Trail Association, America's Greatest Lake Water Trail.

The Bay to Bay Trail's connection to the Lake Michigan Water Trail was solidified by the first piece of the project completed by the team. In May-July 2013, team members spent time conducting fieldwork and familiarizing themselves with the culture and landscape of Sleeping Bear Dunes. Assessing potential kayak launch points along the proposed trail alternatives served as the first step in learning the landscape and tying the project to the broader Lake Michigan Water Trail. GPS points were dropped and an Access Asset form, developed by the Land Information Access Association, was completed for each of the potential launch points. The Access Asset forms were then submitted to the Michigan Great Lakes Water Trails Working Group and have been incorporated into their online geodatabase, which documents the water access points and progress of the trail.

The bulk of the team's fieldwork was spent GPSing alternative trail routes that had been proposed by rangers Tom Van Zoeren and Jim Dal Sasso. While recording the trail routes, GPS points were also dropped for areas of archeological interest, significant slopes, and environmental features including landcover change, invasive species, threatened and endangered species, and wetlands. The GPS data was then brought into GIS and combined with existing Park trails and recorded two-track (old road) and unofficial trails layers. The GPS and GIS work resulted in shapefiles of the trail alternatives and features of interest, which were sent to Kevin Skerl, Chief of Resource Management, to be used in further study of the trail alternatives. The GIS maps were also used to create graphic versions that depict the different alternative routes and their themes or qualities. These graphic maps will be beneficial for public meetings that will be held as part of the EA process.

While in the field, the team also assessed locations for campgrounds that could serve kayakers or hikers on the trail. GPS points were dropped at each site, and a campground matrix was developed to track the qualities and amenities of the campsites. The matrix's value extends beyond the Bay to Bay Trail project as it will be used to assess other existing and proposed campground sites within the Park. Additionally, conceptual plans and renderings of different campground options were developed for use in public meetings and Park staff discussions.

During the spring and summer fieldwork sessions, the team also had the opportunity to interview a number of the local outfitters who would likely provide the equipment sales and rentals to trail users. Discussions with the outfitters gave excellent insight into the local economy, characteristics of Sleeping Bear Dunes' typical tourists, safety concerns, and logistics of providing gear and transportation for recreational activities.

The team was also fortunate to attend the annual Society of Outdoor Recreation Professionals (SORP) conference, which was held in Traverse City in May of 2013. Team members were able to network with professionals working on water and hiking trails across the country and were able to speak with individuals heading up the Lake Michigan Water Trail project. The conference provided an opportunity to become immersed in the professional world of outdoor recreation and to gather ideas and inspiration.

As the Bay to Bay Trail is connecting to something much larger than itself through the Lake Michigan Water Trail, it became apparent that the trail ought to be accessible to as many different users as possible. Visitors of Sleeping Bear Dunes have a variety of physical abilities, which translate into critical design considerations when planning trail routes, kayak launch points, and amenities. In June of 2013, team members attended an accessibility workshop given by Cindy Burkhour of Access Recreation Group. The two-day workshop helped the team develop the ability to assess trails and outdoor spaces for accessibility. Assessment techniques were taught including using one's own body to make rough estimates in the field (e.g. elbow to elbow, determining trail surface stability/looseness, imagining a wheelchair turn-around). Team members also received training on the use of surveyor's wheels and clinometers to measure distance and slope.

Discussion of and information pertaining to universally accessible kayak launches was also provided at the workshop. The team conducted further research into accessibility issues and reexamined the proposed kayak launch sites through an accessibility lens. This research and training has helped the team to produce a collection of best practices, guidelines, and recommendations for making the Bay to Bay Trail accessible to as many abilities as possible.

In addition to fieldwork and workshops, the team also attended meetings with the Bay to Bay Trail Planning Committee, Park staff, and Friends. The EA kickoff meeting for the Kettle Lakes trail, another trail project within Sleeping Bear Dunes, took place during the team's time in the Park. Observing the procedure of the meeting provided the team with an introduction to the EA process and was very applicable to what could be expected of the Bay to Bay Trail EA.

In Fall of 2013, the team continued work on gathering user group input for the trail design. Phone interviews with regional college outing clubs were conducted to gain a sense of whether these groups would be potential users, how they might use the trail, and what kind of experience they would be looking for. A pair of surveys for paddlers and hikers was developed, advertised to user groups, and posted online in a Survey Monkey format. The

surveys covered a variety of topics including predicted trail use, skill level, and amenities and trail experience preferences. The surveys and follow up statistical analysis gives the planning committee some hard numbers to back design and route decisions that affect user experience and will contribute to the EA public input process.

Fall was also a time for research into signage options for the trail. Signage for the Bay to Bay Trail has the unique challenge of needing to communicate with both hikers and kayakers. Conventional trail markers used throughout the Park can accommodate hikers' needs, but communicating take-out points along the shoreline for paddlers proved to be quite difficult. The team networked with other Midwest RTCA offices working on the Lake Michigan Water Trail, researched precedents in the Pacific Northwest for water trail signage, and looked up lakeshore regulations to come up with recommendations for clear signage options. Renderings of signage options and the team's corresponding analysis will help the planning committee in their development of a signage system.

The deliverables that have been presented to RTCA, Friends, and the Park to aid the trail design and EA process have been collected here with the team's analyses and recommendations. Brochure and website mock-ups have also been developed to present trail information to visitors in digital and print media. These products remain in a mock-up stage to allow for customization once the EA has been completed and an alternative route selected. Mock-up versions of the brochure and website template can be seen in Appendices F and G. ❖

II

Site Context:
Sleeping Bear Dunes National Lakeshore

Sleeping Bear Dunes National Lakeshore, runs along the northwest coast of the Lower Peninsula of Michigan in Leelanau and Benzie Counties and covers a 35 mile stretch of Lake Michigan's east shoreline. It was formally established as a park in October 21, 1973, both for its many natural features such as forests, beaches, and dune formations as well as its cultural features such the historic 1871 South Manitou Island Lighthouse, Life-Saving Service/Coast Guard Stations, and Port Oneida rural farm district.[16]

Sleeping Bear Dunes, the Great Lakes and the physical geography of Michigan is a result of the sculpturing, erosion, and deposition of materials by the advance and retreat of glaciers over the last 2 million years – the Pleistocene Epoch. These glaciers scoured the surface of the earth, leveled hills, and altered the previous ecosystems. Glacial retreat was followed by a relatively static interglacial period during which vegetation and wildlife returned. This cycle was repeated several times. The most important glacial advance for northwestern Michigan was the Wisconsin glaciation, which retreated from Michigan about 9,500 to 15,000 years ago. As the glaciers retreated, melt water and large post-glacial lakes formed, and land began to rise. This uplift (or crustal rebound) and the shifting ice fronts caused dramatic changes in the depth, size, and drainage patterns of the post-glacial lakes. The land-sculpting effect of continental glaciation in northwest Michigan is clearly illustrated in the geologic features of the Sleeping Bear Dunes region. [17,18]

Evidence of humans and the presence of spear points and various types of flint in this area dates back approximately 11,000 to 8,000 BCE. Humans were passing through Sleeping Bear Dunes during the Paleo Indian period and survived by hunting local small game, often near the edge of the retreating glaciers that would go on to form the lakes of the region. Native American tribes such as the Potawatomi migrated South, while the Ottawa and Ojibwa settled in northern Michigan. The tribes were hunter-gatherers who used the area for subsistence. They harvested wild rice and maple syrup, and used birch bark from local trees for making storage containers, canoes, and for covering their wigwams. The numerous fish species of Lake Michigan, such as sturgeon, were the native tribes' largest portion of diet. The area is closely associated with the Ojibwa tribe, which provided the origin of the Park's name. As Ojibwa legend has it, a mother bear and her two cubs attempted to swim across

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[16] Karamanski, Theodore J. *A nationalized lakeshore: the creation and administration of Sleeping Bear Dunes National Lakeshore.* Midwest Regional Office, National Park Service, United States Department of the Interior, 2000.

[17] Drexler, C. 1974. Geologic report on Sleeping Bear Dunes National Lakeshore. *Natural History Report for Sleeping Bear Dunes National Lakeshore by U. of Michigan .* Sleeping Bear Dunes National Lakeshore, Empire, MI.

[18] National Park Service. 1961. A proposed Sleeping Bear National Lakeshore, natural history report. National Park Service, Washington , D.C.

the lake to escape a forest fire in their home woods in Wisconsin. As they swam, the two cubs began to grow weary. The mother bear finally made it to shore but sadly, her cubs had become too exhausted in the icy waters and drowned. Today, the largest dune in the area represents where the mother bear waited for her offspring. The mother bear's sand covered shape is said be outlined on top of the high Sleeping Bear bluff on the shore and the two cubs are the North and South Manitou Islands.[19]

The first Europeans came to the region to carry out missionary work and survey and assess the land. The intensification of extraction of the area's resources started with the arrival of the Europeans. Almost immediately came an influx of European fur trappers and traders who explored the area and extracted furs from the mid 1600s through the mid-1800s. This era continued for about two hundred years. Climatic conditions did not favor long-term agriculture and therefore wood products became one of the first commodities to be associated with Leelanau County.[20] The growth and the exploitation of timber was paralleled and facilitated by the growth in the shipping industry. The Sleeping Bear Dunes region was crucial for providing firewood to power steamships for shipping in the Midwest. Villages, such as Glen Haven, sprang up, and docks were built to make use of the opportunity to sell firewood.[21] By the early 1900s shipping revenues were, however, beginning to fall due to the advent of highways and the expansion of trucking companies. The next source of development in the area was heralded by the establishment of D.H. Day's farm and orchard of the over 5,000 cherry and apple trees. This change in land use was accompanied by setting aside forested land for management of forests. There was now an emphasis for managed extraction rather than unmitigated exploitation. In 1920, Day donated 32 shoreline acres connecting Glen Haven to the village of Glen Haven to the State of Michigan[6]. This came to be called D.H. Day State Park and was the precursor to the development of conservation values in the region.

The idea of a national park in northwestern Michigan did not surface until the National Park Service's Great Lakes Shoreline Survey visited the area in 1958. The process of creating a park unit around Sleeping Bear Dunes was steeped in controversy in Congress. United State Senator Philip Hart's active involvement and persistence was one of the main reasons for the

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19 "History of the Ojibwe." First Nations Histories by Lee Sulzman. http://www.tolatsga.org/ojib.html (accessed April 29, 2014).

20 "Sleeping Bear Dunes National Lakeshore – History & Culture," U.S. National Park Service/U.S. Department of the Interior. http://www.nps.gov/slbe/historyculture/index.htm, (accessed April 29,2014)

21 "Sleeping Bear Dunes - Glen Haven," U.S. National Park Service/U.S. Department of the Interior. http://www.nps.gov/slbe/historyculture/glenhaven.htm, (accessed April 29, 2014).

creation of the Sleeping Bear Dunes National Lakeshore on October 21, 1970.[22]

The Sleeping Bear Dunes area has a rich and varied history. This is reflected in the numerous historic and cultural sites throughout Leelanau and Benzie counties. Some of these sites include the Glen Haven Village, the Port Oneida Rural Historic District consisting of 16 historic farms, the Sleeping Bear Point Life-saving Station/Coast Guard Station, and the lighthouse on South Manitou Island.

Glen Haven is a site from the mid-1850s, which originally supplied wood for ships and accommodation for travelers. It is the best-preserved wood station on the eastern shore of Lake Michigan and is a good example of the many small villages and docks that supplied fuel to the steamers of the Great Lakes. Glen Haven was a company town and eventually diversified into farming, fruit canning, and tourism. The Port Oneida Rural Historic District is located in the northern part of the Park. It offers visitors a look at the farmsteads and fields of a farming community around 1900. The high shipping traffic, shifting shoals, and unpredictable weather contributed to many shipwrecks in the Manitou Passage. The Sleeping Bear Point Life-saving Station/Coast Guard Station is a maritime museum and house exhibit about the history of the men who served on Lake Michigan and how they saved the lives of those in danger due to shipwrecks along the Lake Michigan coast. Similarly the lighthouse on South Manitou Island was built as an aid to navigation for the ships passing through the Manitou Passage. The North and South Manitou Islands are sites that have their own history, including fishing in the waters of the Manitou Passage by Native American tribes and the cutting of wood to fuel the Great Lakes steamers and provide lumber for the growing cities on the Great Lakes.[23]

There are approximately 100 miles of designated trails within Sleeping Bear Dunes National Lakeshore. The hiking trails extend the length of the Sleeping Bear Dunes area from Long Lake and Platte Bay in the south to Little Traverse Lake and Good Harbor Bay in the north. There are currently 13 trails on the mainland for hiking, and most of them are also maintained during the winter for cross-country skiing, and snowshoeing. These trails vary in distance, terrain, vegetation and views. The length of the trails range anywhere from 1.5 miles to 15 miles with a mix of flat to hilly to steep and rugged dune terrain. The vegetation

[22] Hawley, Jonathan P. "The politics of National park system expansion:[microform], a comparative study of the authorization of the Ozark National Scenic Riverways in Missouri and the proposed authorization of the Sleeping Bear Dunes National Lakeshore in Michigan." PhD diss., University of Missouri, 1968.

[23] "Sleeping Bear Dunes - Places," U.S. National Park Service/U.S. Department of the Interior http://www.nps.gov/slbe/historyculture/places.htm, (accessed April 29, 2014).

spans a spectrum of evergreen and hardwood tree stands, grasses, shrubs and wildflowers.[24]

In addition to hiking the Park also has numerous near-beach and backcountry campgrounds. Platte River and D.H. Day campgrounds are both within walking distance of Lake Michigan. Mainland backcountry campgrounds include White Pine and Valley View campgrounds. In addition to these there are also backcountry campgrounds on North and South Manitou Islands.[24]

The Platte and Crystal rivers as well as Loon, School, and Bass lakes offer visitors the opportunity for inland kayaking and canoeing. Lake Michigan offers 35 miles of scenic beauty best viewed from the water but unpredictable conditions due to cold temperatures, high winds, fog, and high waves sometimes makes kayaking and canoeing a challenge for non-experienced paddlers.[24]

According to The Outdoor Foundation's 2013 Outdoor Participation Report, in 2012, the percentage of outdoor participants remained the same as 2011 but the total outdoor outings increased from 11.5 to 12.4 billion excursions. The "Leaky Bucket" analysis in the report indicates that outdoor activities gained more participants than they lost in 2012 but there was relatively low churn rate of 6.8 percent.[25] In 2012, the Sleeping Bear Dunes Lakeshore attracted a record 1,531,560 visitors. The last annual high record was in 1999, with 1,364,834 people visiting Sleeping Bear Dunes.[26] The number of annual visitors had steadily increased since 2008. The 2013 count shows a decline, with the National Park Service reporting 1,143,857 annual visits to the Sleeping Bear Dunes Lakeshore.[27] This is still higher than 1,348,304 visitors recorded during 2011. Although a single year decline is not the best indicator of long-term trends the decline in visitor numbers for the area is contrary to national trends. This early indication of a decline in visitors adds momentum to the effort of the Park to diversify activities and enhance visitor experience. ❖

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[24] "Sleeping Bear Dunes - Outdoor Activities," U.S. National Park Service/U.S. Department of the Interior. http://www.nps.gov/slbe/planyourvisit/trails.htm, (accessed April 29, 2014).

[25] The Outdoor Foundation. "Outdoor Recreation Participation Report 2013." Accessed April 28, 2014. http://www.outdoorfoundation.org/pdf/ResearchParticipation2012.pdf, (accessed April 29, 2014).

[26] Glen Arbor Sun. "Sleeping Bear Dunes and a Record Breaking Visitor Tally Up." Article, January 2013.

[27] "Sleeping Bear Dunes - Statistics." U.S. National Park Service/U.S. Department of the Interior. http://www.nps.gov/slbe/parkmgmt/statistics.htm. (accessed April 29, 2014).

III

User Group Surveys

The goal of the GMP is to provide a framework to guide the efforts of the Park in preserving terrestrial and aquatic natural systems, historical and cultural resources, and enhancing experiences for both new and old visitors to the area. The Plan supports the development of the area in such a way that increases the popularity of outdoor recreational activities associated with a hiking/backpacking and camping and supports development of the Lake Michigan Water Trail. With the purpose of enhancing visitor experiences and showcasing one of the primary natural features of the park, Lake Michigan, the GMP supports the idea of establishing a "bay-to-bay" trail for hikers and Lake Michigan paddlers parallel to the mainland shoreline within the Lakeshore. The hiking section of this trail will make use of the beach areas, existing disturbed areas and corridors and link these with interior backcountry trails and campgrounds. Paddlers will be provided better access to calm pockets of Lake Michigan where kayak launch points may be sited and by developing trails and campgrounds that would increases access to inland lakes.

Before such a venture is undertaken it was thought to be useful to elicit responses from users and potential users on various choices, options and dimensions of the proposed Bay to Bay Trail. The Bay to Bay Trail team decided to conduct a survey to better understand what current and future users such as hikers, backpackers, and kayakers think about the existing trails and how alternative hiking trails, campgrounds, and kayak launch sites can enhance visitor experiences.

The survey consisted of 21 questions for hiker and backpacker users and 20 questions for paddler users (see Appendix A). The questions ranged from trail usage preferences to campground amenities and kayak launch site features. Approximately 150 people responded to the hiking and backpacking survey and 75 people to the paddling survey. It must be noted that the surveys takers were a pre-selected set of users chosen from outdoor clubs and contacts of the Bay to Bay team from in and around Michigan. Furthermore, the findings of the survey were based on the fact that most of the respondents were either already using hiking or water trails or had an interest in the outdoor activities of the Bay to Bay Trail.

The results were reviewed through statistical and descriptive analyses. An additional analysis examined respondents' experience levels and the distance between their homes and the Park. The respondents were categorized into beginner, intermediate, advanced and expert users. Experience levels are defined in the appendix. Visitor travel to Sleeping Bear Dunes was categorized into three groups: one-hour drive, six-hour drive, and a day drive. Chi-square and ANOVA with 95% confidence interval were used to determine whether two factors are independent and whether at least two groups were significantly different. If the results of further analyses are significant with p-value < 0.05, the further comparisons would be

showed by charts and descriptions. The complete descriptive and statistical analyses with charts and tables can be found in Appendix B.

Summary of Survey Results for Bay to Bay Hiking and Water Trail

Findings – Both Backpackers and Paddlers

- Both backpackers and paddlers show high preference to use the kind of trail which they were familiar with if it were to be built as proposed. However, paddlers show higher preference to use the new hiking trail than the preference of backpackers for the water trail.
- The proportion of backpackers who envision themselves being part of a group where some members paddle and others hike is less than the proportion of paddlers. The proportion of the paddlers are about half.
- Both backpackers and paddlers prefer a remote, wilderness experience. The farther from the road the better.
- Both backpackers and paddlers wanted a map with distances as a tool for information before or during the trip
- Generally, significant numbers of both backpackers and paddlers indicated a preference for 4-6 hours trail using per day. Specifically, there are tendencies that more experienced users prefer to hike more hours per day than less experienced users. Local backpackers within an hour drive to the Park prefer to hike fewer hours than the other backpackers.
- Both backpackers and paddlers showed a strong preference for a campsite either in the woods or on the foredunes behind the beach and the least preference for sunny or open locations. Specifically, advanced level backpackers showed a relatively high preference for camping on the foredunes behind the beach, while beginner levels backpackers did not show preference for campsites in the wood.
- For campground amenities, both backpackers and paddlers ranked solitude as their top preference followed by a preference for pack in/pack out garbage regulations. There are different preferences among different experience levels for campground amenities. Different level backpackers have diverse preferences for access to overnight parking and garbage/recycling receptacles nearby. Likewise, different level paddlers have diverse preferences in vault toilets, potable water, fire pit, shared fire pit, and pack in/ pack out garbage regulations. For the differences, generally, less experienced users tend to give higher scores for amenities, while more experienced users do not regard these amenities as that important.
- Both backpackers and paddlers showed a strong preference to know the weather conditions. Paddlers also showed a strong preference for access to a marine forecast.

Findings - Hiking and Backpacking

- Out of 150 respondents, a large proportion of hikers were interested in a wilderness hiking/camping experience. Unexpectedly, a challenging hiking/camping experience was the least preferable type; even expert level backpackers do not show a preference for it.
- A large proportion of the respondents live either within an hour drive or within a six-hour drive of Sleeping Bear Dunes.
- Hikers and backpackers had an equal preference for a multi-day trip spanning the entire National Lakeshore, a multi-day trip through part of the National Lakeshore or a single day trip for a section of the trail. Specifically, beginner level backpackers do not prefer a multi-day backpacking trip spanning entire the National Lakeshore, while most local backpackers within an hour drive are willing to do a day hike on a section of the trail.
- A "scenic view" is the most preferred experience when selecting from these possible experiences: scenic view, challenging adventure, wildlife viewing, and diversity of landscape. Diversity of is the second ranked preference.
- For land covers for the Bay to Bay hiking trail, woodland, dunes, and beach are the top three preferences, while steep terrain and historic farmsteads have relatively low preferences. On the other hand, for trail types for the Bay to Bay hiking trail, a single track dirt trail is most preferable, while a multi-use trail (paved or limestone) is not preferable.
- Most backpackers would prefer about half of the hiking trail to closely follow the Lake Michigan shoreline.
- A large proportion of backpackers had a preference for either a 5-7 mile or a 7-10 mile hike when travelling between campgrounds. Specifically, more experienced backpackers tend to prefer longer distances between campgrounds.
- There was almost equal preference for viewing information about the trails by going online, through a paper brochure, by downloading a map off the website and through maps available at the Park Visitors Center. There was less preference for information disseminated through a mobile app. Intermediate, advanced and expert backpackers showed a greater affinity for receiving their information via a map off the website.

Comments from Hiking and Backpacking respondents

- Keep natural areas as undisturbed as possible, only have foot trails thru sensitive dune areas!
- If you build another trail and more campsites, you will make true solitude much more difficult. Please, if the trail must be built, please limit the number of campsites to 3, if it is a choice

between 3 and 5. Obviously, my choice is to halt all the future destruction that comes with building.

- Limit impact to existing campgrounds (Platt River & DH Day). Would prefer trails to skirt existing campgrounds, not traverse straight through.
- This mainland trail is a great idea. The more remote the better. Please do not over develop this thing - some good marking and fairly clear paths are all that is needed.
- Sand camping is actually quite annoying. Not only do non-free standing tents have trouble staying anchored but the sand gets everywhere. Being by the lake is great, but only if there is shade and firm ground. A platform would be 100% necessary.
- Is a reservations system planned? NPS should know who and how many are on the trails and camping. Hikers need to know there will be campsites available. Will overnight parking lots be secure? Limit access to campsites by road (except for emergency vehicles).
- I am very excited to see this in the works - it is long overdue. Please consider a few suggestions: 1) Consider placing backcountry campsites more than 1 mile away from road access. This would decrease the use of sites by folks who drive in, which limits backcountry use. Also this will decrease the use of these sites as "party" spots. 2) Potable water is not too important to me as long as you are near Lake Michigan or tributaries. 3) Consider placing many backcountry campsites along the trail to provide many options regarding the length of the hike each day. 4) Bear lockers/poles are godsends at the end of a long day of hiking. They will also decrease instances of human animal conflict. 5) I would prefer a trail that follows the ridgeline rather than the beach.

Recommendations

- When deciding on trial alternatives, an emphasis should be put on trails that allow for a combination of a wilderness experience and a moderate hiking experience rather than a trail that is more challenging.
- A hike on a trial should ideally take a beginner or moderate level backpacker no more than 8 hours.
- An effort should be made to have trails that enable hikers and backpacker to experience solitude.
- Campsites should either be located in the woods or on the foredunes.
- Campsite locations should be roughly 7 miles apart. This may mean having approximately 5 campsites traversing the length of the shoreline, in additional to backcountry campsites.
- A website with information about the trail would be a key tool for providing trail information.

Findings -Water trails and campsites for paddlers

- The paddler survey results indicate that a majority of the paddlers are kayakers, while over half advanced and expert paddlers are also canoers. A proportionately larger segment of the respondents had a preference for kayaking.
- The majority of paddlers were intermediate and advanced paddlers. The expert paddlers were the smallest group among the respondents.
- The highest proportion of paddlers paddle over 9 times a year. Only beginner paddlers do not show this tendency.
- A majority of the respondents to the survey lived either within an hour drive or within a six hour drive from Sleeping Bear Dunes.
- The highest number of survey takers preferred a day-long paddling trip, while only few paddlers showed a preference for a multi-day trip spanning more than the Sleeping Bear Dunes lakeshore. Specifically, only expert paddlers have a of majority respondents who prefer multi-day trips spanning beyond the Sleeping Bear Dunes lakeshore.
- A launch site with a short carry option (distance of less than 100 feet) and available parking was the preferred choice for a large proportion of paddlers. A visibly high proportion of intermediate, advanced and expert paddlers marked their preference for such a launch site.
- A large proportion of respondents indicated a distance of 100-300 feet from the lake as their first preference for a campsite location. The least preferable options were for campsites less than 100 feet or more than 1000 feet from the lake. Both intermediate and advanced paddlers were not averse to any one option but had a strong liking for a camp 100-300 feet from the lake. The park currently does not allow camping closer than 300 feet to the water.
- The most preferred launch site amenity was overnight parking followed by restrooms. There are different preferences among different experience levels for launch site amenities in lighting, space to turn a vehicle around, picnic area, power, and shelter. Similar to the trend of preferences for campground amenities, less experienced paddlers tend to give higher scores for the amenities, while more experienced paddlers do not regard these amenities as that important.
- Survey respondents showed a marked preference for online booking of a reservation for a campsite. No local paddlers within an hour drive like first come, first serve, while some of the other paddlers prefer no reservation (first come, first serve). On the other hand, it is surprising that not many local paddlers prefer to book and reserve a campsite at one of the existing reservation points in the Park.

Comments from paddling respondents

- I am fearful that all the access areas are going to be overbuilt. I believe that the trail has been great because they limited the number of parking spots and a lot of concrete and asphalt. Let's keep in mind that most campers/kayakers are outdoors people and that they will be using this. We do not need to over build any of these areas as the people who are going to use these areas don't want all the frills. If you don't kayak now or paddle you aren't going to suddenly take it up. True outdoorsmen will use these facilities. This pristine area should be damaged as little as possible and have almost no permanent structures or parking. Give us access but keep it remote and with nature in mind. PLEASE!

- Do not have campground with first come first serve like DH Day, that is AWFUL and you can never get into the campground! I want to camp on the beach or at least NEAR the beach with a kayak. This should be rustic camping, not RV camping. As long as there is water and bathrooms. Great idea!!! Finally!

- I feel strongly that you should consult the Leave No Trace principles when siting these amenities and posting how people should behave on this trail. I would be saddened to see campsites right along the beach or any closer than 200 feet from the water.

- Good, waterproof maps of the water and hiking route, with distances between points clearly marked.

- Information on estimated paddling time between different points along the Lake.

Recommendations

- When considering the length of a water trail between launch points/beach access, it would be prudent to take into consideration that most of the respondents preferred planning a day-long trip with a paddling trip lasting anywhere from 2-6 hours.
- Traffic issues of any water trail conceived would be considered based on the fact that a lot of the survey respondents have indicated that they paddle over 9 times a year.
- As per the survey results, a launch site with a short carry option (distance of less than 100 feet), overnight parking and restrooms would be ideal.
- Development of campgrounds for paddlers should be based on factors such as solitude and a distance of 100-300 feet from the lake, set on the foredunes near the beach or set in the woods.
- A website would be useful as it would enable reservation of a campsite through online booking, allow downloading of maps with distances as a tool for information before or during the trip and contain links for weather conditions and the marine forecast.

Survey Limitation

It should be noted that, for chi-square analyses in this survey, some results may not be very robust because the numbers of specific categories, such as preference or non-preference of expert level, may not be large enough (smaller than 5), and may influence the results. Also, any decisions with regards to finalization of the water trail should keep in mind that users are likely to be either intermediate or advanced level or a smaller number of expert kayaker and canoers. The ratios of experience levels of survey respondents may not reflect that of future trail users and is an acknowledged bias of the survey. ❖

IV

Stakeholder Interviews

Both outfitters and outdoor clubs are vital stakeholders who can provide important information and allow us to gain an insight as to the best alternatives for the Bay to Bay Trail. Getting to know their opinions and positions is essential before any decisions are made for the further development of new hiking and water trials in the area.

Owners and managers of outfitting companies and members of outdoor and college outdoor activity clubs are good sources of information on the kind of outdoor activities being carried out in the Sleeping Bear Dunes area. Outfitters in the area regularly offer equipment and services to hikers, backpacker and paddlers and are therefore in an ideal position to provide feedback on the usage and trends regarding all activities in the area. They would be able to comment on the current trails and the viability of any alternate trials that the Bay to Bay project and University of Michigan team is hoping to propose. Similarly outdoor clubs, both those focused on specific outdoor activities and college clubs focused on more general recreation, offer good sources of information on existing and potential usage of the trails and facilities at the Sleeping Bear Dunes National Lakeshore. Information from these stakeholders would help in better understanding critical factors related to creating alternative trails, campsites, and accompanying facilities.

In order to better understand the variety of activities and to get information on issues important to outfitters and outdoors clubs, a series of questions were put together in surveys distributed to targeted recreation groups.

The questions for the outfitters included issues such as such awareness of the proposed plans for a new hiking and water trails and accompanying camping sites and their linkages, the methods of information gathering about the hiking, kayaking and campsites, the customers' trail expectations, preferred facilities at kayak launch points, the level of interaction with the Park, services offered by the outfitter, the likelihood of change/benefit/expansion in business from additional hiking/water trail, and the outfitters' areas of concern. Face-to-face interviews by the University of Michigan team were conducted with Backcountry North, Crystal River Outfitters, Sleeping Bear Surf and Kayak and Wet Mitten during the months of May to July 2013.

The questions for the outdoors activities clubs included issues such as the club's activities, the number and experience/expertise of the members, location of usual trips, the methods of information gathering about the hiking, kayaking and camping trips, the likelihood of going to Sleeping Bear Dunes to use the Bay to Bay Trail in the future and length of these trips, the trip expectations (such as visitor experience and feeling of remoteness), and the clubs' members willingness to participate in the planning of the trail through a user group

survey. Michigan State University Outdoors Club, Hope College Outdoor Adventure Club, Northwestern University Outing Club and Traverse Area Paddle Club were contacted over the phone by the University of Michigan during the months of August to December 2013.

Findings: Outfitters

- Knowledge of the proposed new hiking and water trails
  - Outfitters were aware or were informed (at the start of the interview or during the time for the request of interview) of the proposed plans for the new hiking and water trails and accompanying camping sites at the Sleeping Bear Dunes Lakeshore
- The need for a hiking trail, backcountry campgrounds and water trail linkages
  - More camping sites needed
- A variety of methods to be used for reserving campsite and not limited to online booking (to facilitate flexibility and change in plans due to change in weather conditions)
  - Would create more of user experience with combination of hiking, camping and water trails
  - Concerns: water safety on Lake Michigan
- Key: float plans (family and Park to know these plans)
- Information gathering for hiking, kayaking and other outing trips
  - Personal experience: grew up near SLBE, know the area well
  - Good relationship with Park
- Trail (water trail or backpacking trail) experience that customers are hoping for
  - Big trip of the year
  - Solitude and wilderness while on a hiking trip
  - Trip from campsite to campsite
  - Campsite and paddling combination trips (for more experienced people)
- Kind of facilities offered at the kayak launch points (cell phone coverage, toilets, potable water, etc.)
  - Restrooms
  - Potable water
  - Designated parking: especially for boat launches

- Kind of communications would you like to have with the Park and between the various outfitters near and around the Sleeping Bear Dune Lakeshore
  - As water conditions change, there should be clear communication with outfitters and users about safety
  - Users might need to camp out extra days due to changes in weather conditions
  - Outfitters may need to pick up earlier or drop off later
  - Services or products (shuttles, equipment and gear) you currently offer
  - Rent: kayaks, canoes, stand-up-paddler boards and bikes
  - Sell: kayaks, canoes, stand-up-paddler boards and bikes
  - Sell and rent camping gear
  - Shuttle services to Crystal river
- Change in business for outfitters from the addition of a hiking/water trail
  - Increase in more customers so more opportunities to sell and rent kayaks, canoes, stand-up-paddler boards and bikes
  - Camping gear offerings could expand
  - Shuttle service to Lake Michigan would be challenging
- Likely benefit from these new additions and expansion in a particular area of your business as a result of these new trails (number of customers X sales/customer)
  - Increase in number of customers
  - Marketing should be toward expert paddlers (already have their own gear)
- Plans on conducting some programing, such as orienteering, equipment familiarization, training etc. for client/customers
  - Depends on size of groups or specific tours or request from customers
  - Water safety is always an important element when briefing customers on the water activities
- Three most important areas of concern to be addressed (e.g. details on development of kayak launch sites, campsite locations, and distance between various sites)
  - Water Safety
  - Emphasis should be on hiking trail: expands user base and multiple seasons visit
  - Campsite distances should be achievable within a day
  - Involvement in the development of this new trail system
  - Willing to work with surveys
  - Like to be involved in the stakeholder engagement
  - Like to be kept updated on the latest plans for the trails
  - Like to maintain close touch with Park

Findings: Outdoors Club

- Clubs were unaware of the Bay to Bay Trails project. They were informed of the plans during the interview
- Club activities
  - day/weekend hiking and backpacking
  - camping
  - kayaking, canoeing and portage, rafting
  - indoor climbing gyms, rock climbing
  - biking
  - winter hiking, skiing, snow shoeing, ice skating, luge
- Total membership and active members
  - listserv: 100-700
  - active: 25-30
  - involved year-round: 25-30
- Usual trips
  - Pictured Rocks, Manistee National Forest, Wilderness State Park(rustic cabin), Grand Ledge, Red Cedar River(kayaking) , Smoky Mountains, Tennessee and North Carolina (for longer and out of state trips), Devil's Lake (Wisconsin), Red River Gorge (Kentucky), Indiana Dunes (Indiana) , Planet Rock for climbing
- Level of experience/expertise
  - hiking/backpacking
  - even mix across beginner/intermediate
  - kayaking
  - beginner/intermediate
  - intermediate/advanced
- Information gathering for hiking, kayaking and other outing trips
  - member experience/ faculty advisor member/ other schools' outing clubs
  - online information
- Trips taken to this area of Michigan (Sleeping Bear Dunes, Traverse City, Pictured Rocks)
  - Pictured Rocks,
  - Sleeping Bear Dunes area – 2-3 times a year

- Location and type of activities in this area of Michigan
  - 4-day break- backpacking the Lakeshore
  - Weekend hiking trips (20-50 people), not too much kayaking
- Would you foresee your club visiting Sleeping Bear Dunes to use the Bay to Bay Trail in the future?
  - Yes, but one hindrance right now is the lack of a multi-day hiking trail. Worth the time to spend a weekend if the longer Bay-to-Bay trail was built
  - A lot of interest, appealing to have the water trail component
- Duration and type of usage of the trail
  - Multi-day trip (backpacking - club has backpacks, tents, limited camping equipment but no boats)
  - Multi-day trip (paddling)
  - Multi-day trip (backpacking & paddling)
- Water trail or backpacking trail experience that club members are hoping for (difficulty of activity, feeling of remoteness, etc.)
  - Very important to feel somewhat secluded/ out in nature- particularly important for the campsites. Trail should be accessible, but nothing in SLBE would be too difficult for members
  - Tranquility, peacefulness, solitude, feeling of remoteness, higher level of difficulty
  - Secluded, remote trail
  - Workout hiking & paddling, but not difficult- accessible to all members
- Interest in participating in the planning of the trail through a user group survey
  - Would be happy to take user group survey and send out survey link over the listserv

Recommendations: Hiking/Backpacking

- Solitude and wilderness experience a top priority
- Trails should cater to an even mix of beginner/intermediate level hikers and backpackers
- Online availability of information on trails
- Development of multi-season trails for various activities

Recommendations: Campground

- Even spacing between proposed campgrounds (distance between campgrounds as per the Shorts Brewers trial run was ideal)
- Secluded campgrounds are the preferred choice
- Placement of campgrounds relatively near the shore (behind foredunes or in the woods)
- If camping in the foredunes, setting up tents on the sand would be preferable
- Should designate places to set up tents (e.g. within a couple of feet from an official post)
- Provide a "Critter Bin" or "Bear-resistant food storage bin" at each campground.
- No fire ring needed in the campground if campfires can be used on the beach.
- Provide a pit toilet at each campground
- Provide GPS coordinates for campgrounds
- Signs to mark campgrounds or beach access points not to be too big or obtrusive
    - Reflective paint or images on the signs for better visibility from headlamps for paddlers coming in at night.
- Provide educational or interpretive signs in the campground.
- Online information about each launch point and campground with detailed descriptions
- Online reservation system

Recommendations: Launch Points

- Online list of the launch points with descriptions, GPS coordinates and details of the facilities
    - Indicate which ones are more "emergency take-outs", like Lane Road, which offers close proximity to the road, but requires two people to carry the boat up the stairs.
- Potable water, restrooms
- Easy to drive to and turnaround ❖

V

Trail Alternatives

The majority of the 2013 spring and summer fieldwork and the following fall semester data analysis was spent identifying potential hiking trail route alternatives. According to NEPA, an EA must include a range of alternatives that meet the objectives of the project and minimize environmental impacts. A 'No Action' alternative must also be included. This alternative preserves the option to abandon the project and creates a benchmark for impact comparisons. The EA will also include a discussion of alternatives that were initially considered but rejected.[28] The Bay to Bay Trail project has one such instance with an early proposed route that went through Sleeping Bear Plateau. This alternative was rejected after considering the fragile vegetation, lack of protection from the elements, and extreme terrain.

The alternative identification process began with data collected by Tom Van Zoeren and Jim Dal Sasso in their original scoping work for the trail routes and campground sites (see Appendix H). Although considered a new trail route, the Bay to Bay Trail would be composed of four different trail types, only one of which would be newly created. The trail types that were incorporated into the alternative routes include existing official Park trails, existing unofficial trails (aka "social trails")[29], two-tracks (old, unimproved roads)[30,] and non-existing new trail. The Sleeping Bear Heritage Trail has the potential to overlap with a number of segments of the Bay to Bay Trail. For this reason, it is identified in its specific phases of development: completed, planned, and conceptual (proposed).

Most of the trail route inventory was spent GPSing two-track, unofficial, and new trail segments. An NPS Trimble® unit was used to create trail route lines by manually dropping points approximately every 500 feet. This method was subject to error due to turns in the trail route and significant difficulties with satellite signals. The GPS point collection was done in the late spring and early summer. Canopy coverage at this time of year was enough to interfere with reception and resulted in fewer points for the line to reference. Some of these errors were corrected in ArcGIS by digitizing and referencing road or existing trail layers. Key features of the trail were documented through GPS points and assessment forms (see Appendix I). Views from the trail were also photographed for documentation. The trail features of interest that were documented and passed along to the Park's Natural Resources Division include archeology sites (e.g. middens, historical structures and remnants), invasive

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[28] National Park Service, Department of the Interior. Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making Handbook, 2001, Sect. 5.4.

[29] The unofficial or "social" trails are typically well established and would require little to no clearing in many cases.

[30] Many of the two-track segments are currently difficult to identify and in some cases would require significant clearing.

species, endangered or threatened species, wetlands, points of significant land cover change, and significant slopes (i.e. over 10%). The record of the features and their location will contribute to the Natural Resources Division's documentation of the Park and will help with the analysis of the trail alternatives. Natural barriers (e.g. streams or seasonal high water) were not marked and could be a helpful element to identify in the next steps of the trail planning.

Following the GPS point collection, raw data was uploaded to the Natural Resources Division's database. This data along with the original route proposals from Tom Van Zoeren and Jim Dal Sasso, official Park trails, Park boundaries, and area roads were combined in ArcGIS for further analysis during the fall 2013 semester. A series of merging and digitizing functions were conducted to generate a map showing the complete inventory of trail segments from which the alternative routes would be extracted.

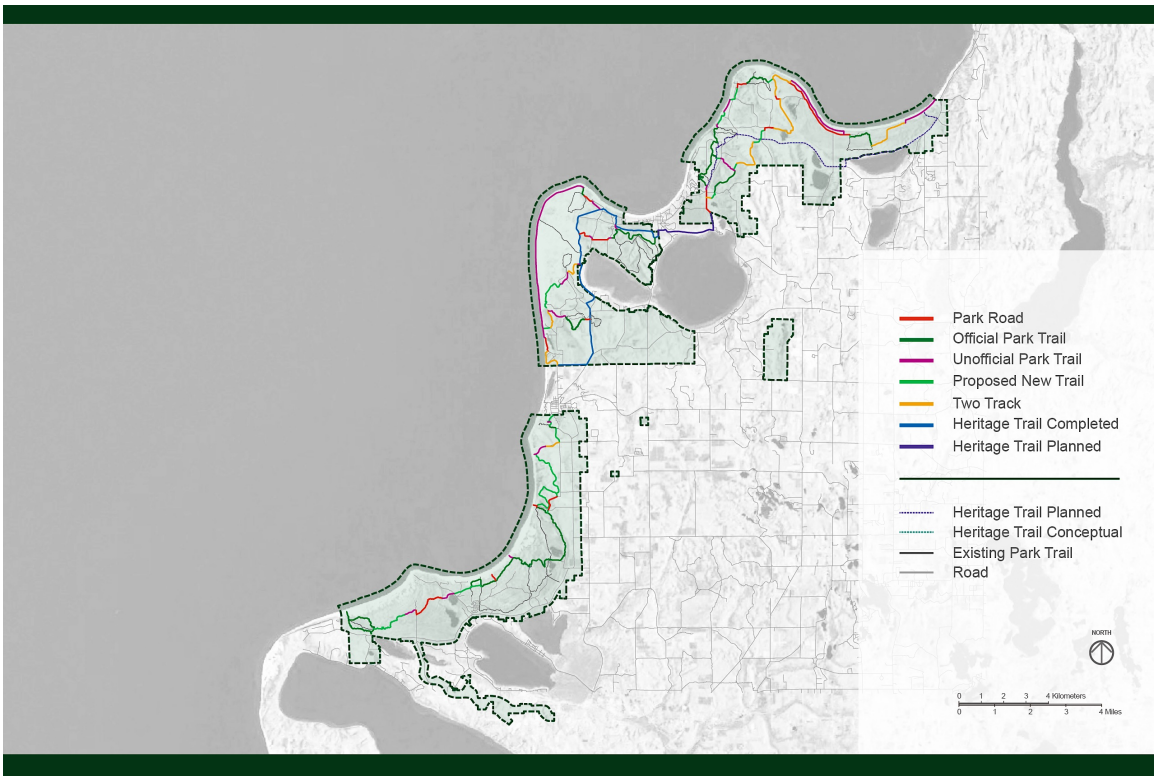

Figure 1. Trails Segments

In March of 2014 the U of M team met with Barbara Nelson-Jameson, Kerry Kelly, chairman of Friends, and Bob Grese to review the inventory map of the trail and determine

the alternative routes. Differences in visitor experiences, potential effects on natural resources, and practicality of development were considered during the process. By the end of the meeting, three distinct alternatives had been identified: (1) Beach Route, (2) Developed Trail Route, and (3) Wilderness Trail Route.

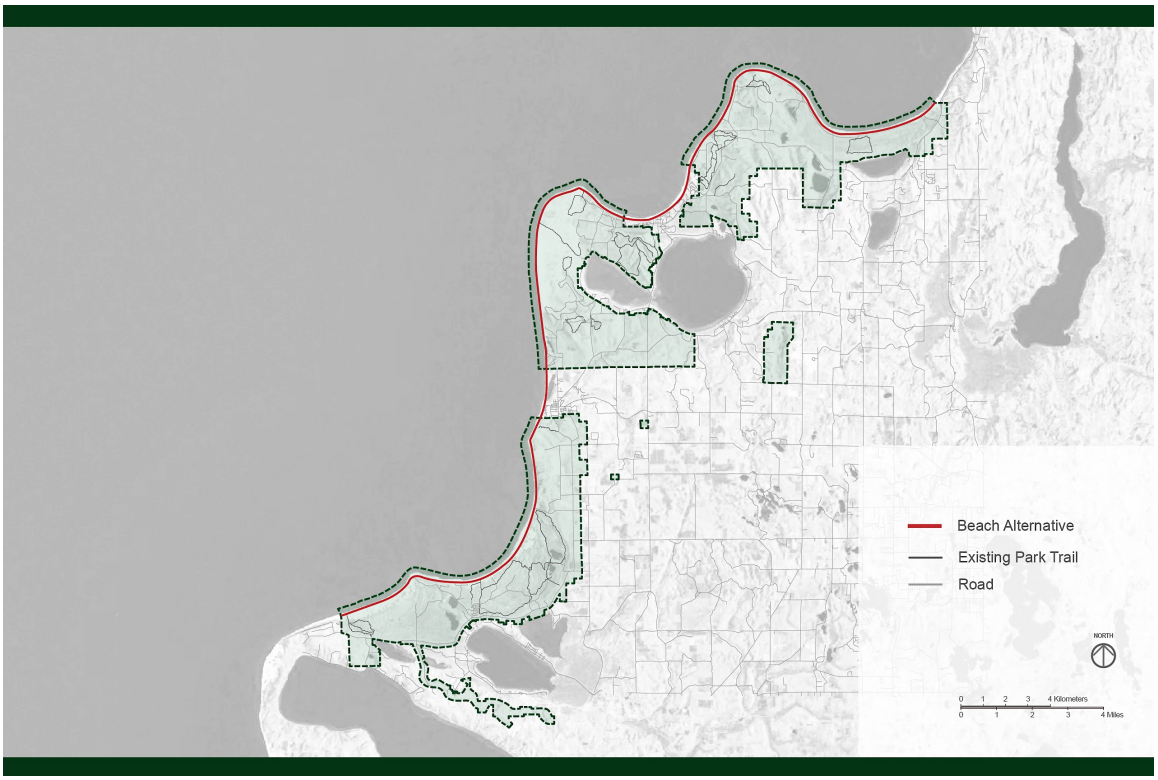

Figure 2. Beach Trail Route

The Beach Route is perhaps the most straightforward alternative; it would follow the shoreline in its entirety. This option would provide the quintessential lakeshore experience and would stay true to the trail's name. Backpackers would, in fact, hike from bay to bay. Following the shoreline would also provide a direct link to the water trail. Groups that choose to split up between the hiking and water components would be in close proximity and would have an easy time reconvening at the end of the day. Additionally, disabled visitors may be able to use parts of the trail with the aid of sand wheelchairs, available at the Maritime Museum boathouse and at the Cannery.[31]

[31] National Park Service, U.S. Department of the Interior. Sleeping Bear Dunes- Accessibility. http://www.nps.gov/slbe/planyourvisit/accessibility.htm.

The Beach Route alternative would likely have a low to medium degree of impact. Trail clearing would not be required, but issues of litter going directly into the water or damage to beach and dune vegetation may arise. Not all sections of the trail would be accessible at all times of the year due to dynamic water levels. This issue would require backpackers to pre-plan alternative routes or come up with impromptu detours. Hiking through sand can be quite challenging, especially while carrying a backpack. The trail would also fail to offer any protection from the sun, wind, or heat, which can become quite extreme in the summertime. Not all visitors may be up to this challenge.

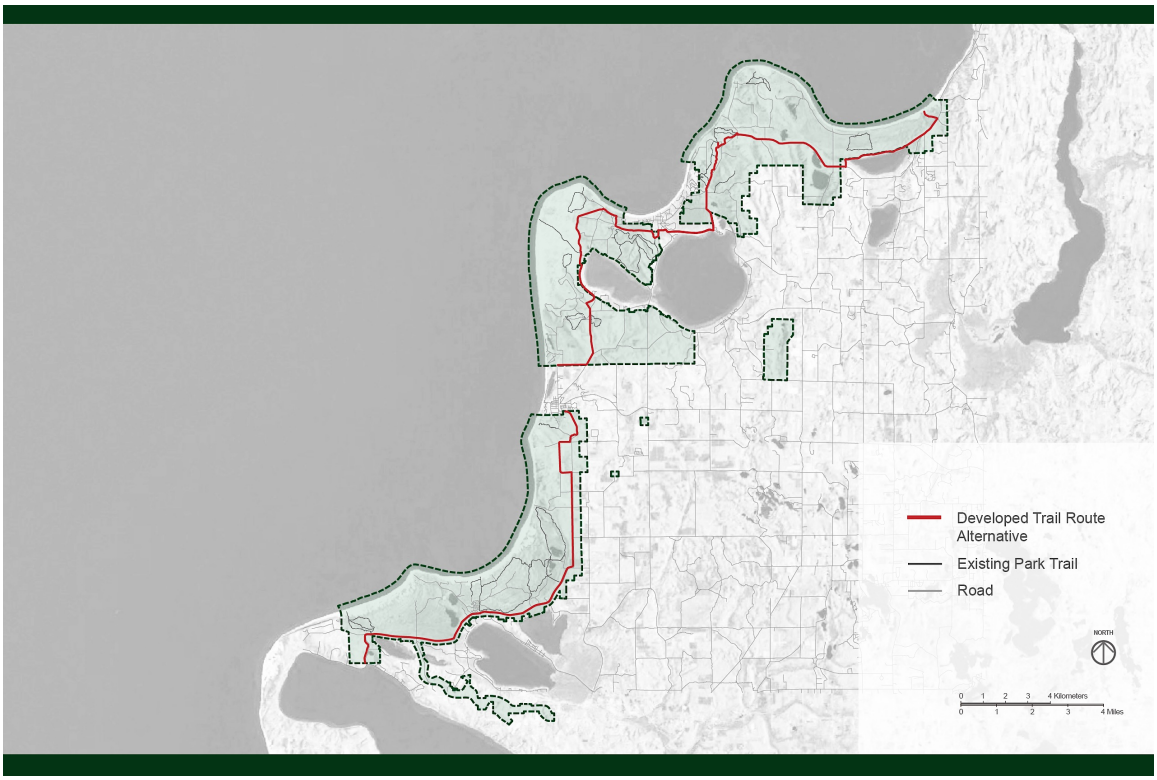

Figure 3. Developed Trail Route

The second alternative, the Developed Trail Route, follows the Sleeping Bear Heritage Trail as much as possible. The Heritage Trail is a developed, paved trail, which is also open to bicyclists. This option would likely have a low degree of environmental impact because it would be using pre-existing trail as much as possible. The level of required exertion would be quite low, and the paved surfaces would open many segments to visitors in wheelchairs. The Developed Trail Route may be particularly appealing to new hikers, scout groups, the elderly, or families with young children and strollers. Overlapping portions with the Heritage Trail would also open the Bay to Bay Trail experience to bicyclists. Although it wouldn't be possible to bike the trail in its entirety, groups could add a third mode of travel to their trip.

Segments overlapping the Heritage Trail would be quite busy during peak times of the summer and would offer little to no sense of solitude. Visitors looking for a challenge would probably not be satisfied by the terrain of this route. The views and experience of the lakeshore would also be quite limited compared to the other alternatives.

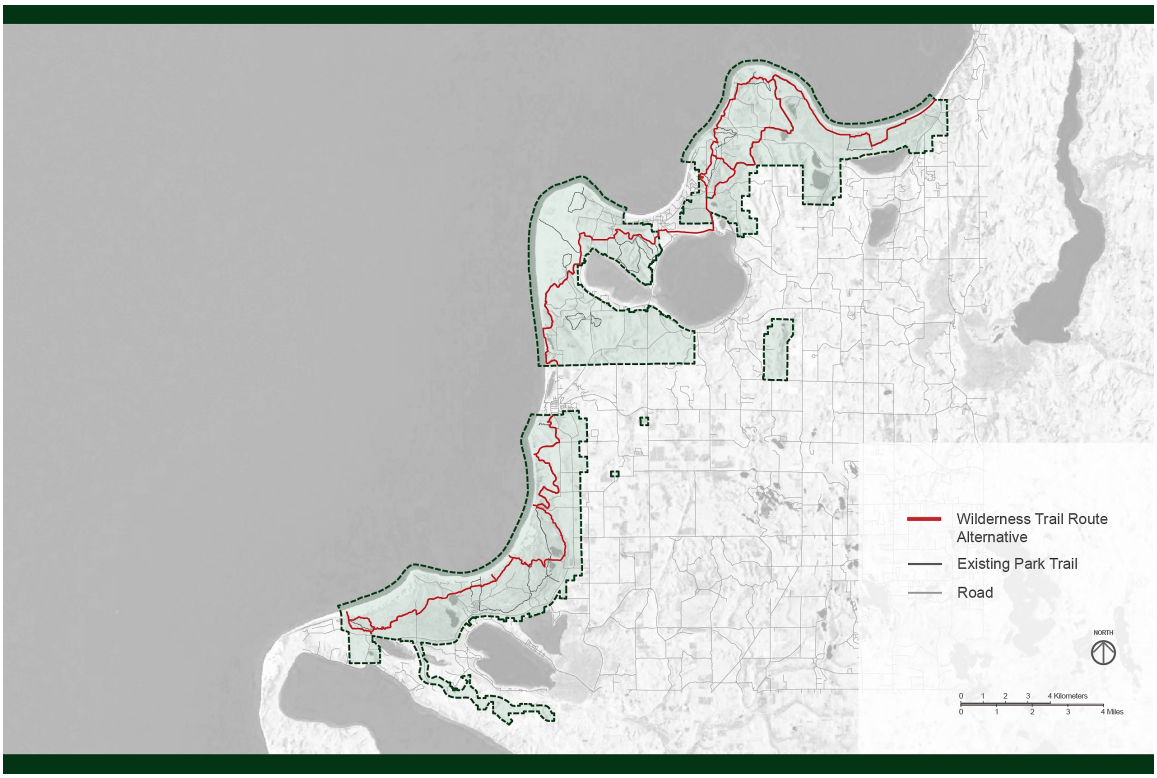

Figure 4. Wilderness Trail Route

In contrast to the Developed Trail Route alternative, the Wilderness Trail Route would deviate from the Heritage Trail as much as possible. This option would provide a backcountry experience offering solitude and distance from busier parts of the Park. The route could include two loop segments, which would provide views of the lakeshore and more challenging terrain. The Valley View and White Pine backcountry campgrounds could be easily assimilated into the trail with this alternative, alleviating some of the demand for campsites along the lakeshore.

Development of this alternative would likely result in a medium degree of environmental impact. The Wilderness Trail Route would have the most new trail running through designated wilderness. The route would need to be carefully examined by the Natural Resources Division to determine if sensitive landscapes would be affected. This alternative would also be the least inclusive option for disabled visitors. Uneven terrain and significant slopes would make most of the trail inaccessible.

The next step in the EA process will be to examine the identified alternatives. Park staff and Friends will need to determine whether there are additional alternatives to assess, and whether any of the identified alternatives should be rejected before proceeding. It may be beneficial to investigate new alternatives that combine various parts of the routes initially identified. A combination of the alternatives could provide visitors with the opportunity to choose what type of experience they seek from the trail. The Natural Resources Division will then need to analyze the alternatives for their potential impacts. The public input process of the EA will help gage opinions on the alternative routes as well. As of March 2014, it is expected that the EA will be completed by March 2015. At that point, an alternative will be officially proposed. The proposed alternative may be a compilation of the routes identified above or may be an entirely new route yet to be determined. The 'No Action' alternative is also a plausible proposal if the trail is predicted to result in significant impacts.

The U of M team's work on the Bay to Bay Trail project has aimed to aid the Park in the EA process through initial public input gathering and trail route scoping and assessment. The team is eager to follow the process of the EA in the upcoming months and see where it will direct the project. ❖

VI

Water Trail

A water trail, as defined by the Land Information Access Association (LIAA), is a route or collection of routes on a defined waterway that is supported by a network of public access points. The Lake Michigan Water Trail, to which the Bay to Bay Water Trail will contribute, is on its way to fulfilling the requirements of a defined water trail. The overarching umbrella organization for the trail, the Lake Michigan Water Trail Association, was formed in January of 2010. The Association is made up of numerous groups including planning commissions and the Department of Natural Resources from each of the four border states: Michigan, Indiana, Illinois, and Wisconsin. The association came together with the desire to create a contiguous water trail around Lake Michigan following the Burnham to Marquette Water Trail Expedition of 2009.[32] The expedition was a weekend long sea kayak trip that took participants along the then-new Indiana Lake Michigan Water Trail from Michigan City, Indiana to downtown Chicago.[33]

The success of the trip sparked the idea for a water trail that would bring together planning commissions, NGOs, and government agencies across political and geographic borders to complete a contiguous trail along the lake's perimeter. Today more than 75 miles of trail have been completed along the southern shore of the lake, and most of the four states are in various stages of inventorying and documenting lakeshore access points along the trail route.[34]

Within Michigan, The Michigan Great Lakes Water Trails Working Group is the overarching organization contributing to the state's input on the Lake Michigan Water Trail. Although charged with linking regional water trails to form a statewide water trail system covering all of Michigan's Great Lakes, the coalition was first formed in November of 2012 to develop a Lake Michigan coastal water trail. The group is a partnership between LIAA and four regional planning organizations across the state.[35] Currently the coalition is in the process of collecting information regarding Lake Michigan access points and developing an online geographic database for the trail.[36]

The U of M masters project team contributed to the documentation of the water trail access points by collecting GPS points and completing access point asset record forms during the

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[32] Lake Michigan Water Trail Association, The Association, http://www.lmwt.org/association.html.

[33] Northwest Indiana Paddling Association, 2009 Signature Events: Marquette to Burnham Expedition, http://www.nwipa.org/linked/nwipa_expedition_event_description.htm.

[34] Lake Michigan Water Trail Association, America's Greatest Lake Water Trail, http://www.lmwt.org/thetrail.html.

[35] Northwest Michigan Council of Government (NMCOG), West Michigan Shoreline Regional Development Commission (WMSRDC), Southwest Michigan Planning Commission (SWMPC), Eastern Upper Peninsula Regional Planning & Development Commission (EUPRPDC).

[36] Michigan Great Lakes Water Trails, About, http://www.michiganwatertrails.org/about.asp.

group's fieldwork session in May of 2013. The access points, identified as potential kayak launch/landing points in the initial scoping of the trail, amount to 18 sites. The potential launch sites span the length of the Park (within and outside of NPS jurisdiction) and include sites at Point Betsie and Leland Harbor, which are located south and north of Park boundaries. The asset record form[37], developed by LIAA, records site jurisdiction, latitude and longitude location, description notes regarding unique features and significant encumbrances, and location amenities such as parking, restrooms, and nearby campgrounds. The completed asset forms were sent to LIAA and have been incorporated into the Michigan Great Lakes Water Trails online database of the Lake Michigan Water Trail.[38] In addition to completing the asset record forms, two to three GPS points were dropped at the site using a NPS Trimble unit. For each site, a point was taken on the beach at the water access. This point can be used in the future for lakeshore landing signage and creating future GPS-based water trail maps for mobile devices. The second point was taken at the road end or parking lot leading to the water access. This point allows for measurement between a vehicle and the water, which is important when considering boat carrying or carting. A third point was taken where applicable when the parking lot or road end was set back from the main road by an entrance drive or trail. This point will be useful in siting road directional and launch site entrance signs.

The collected GPS points were then uploaded to the Park's GIS system and transferred back to the U of M team for analysis. According to the Lake Michigan Water Trail guidelines, there can be a maximum of 5 miles between launch points or beach access.[39] These guidelines have been set to reflect reasonable paddling distances and safety concerns about being able to reach land at regular intervals along the water trail. The majority of the launch points meet the distance standards, but two areas will require further analysis. The distance between the North Bar Lake and Glen Haven Beach launch points is approximately 7 miles. Paddlers may find it difficult to get to shore between the sites due to the steep bluff area along the lakeshore. Likewise, the distance between Good Harbor Beach and Vans Beach is just over 6 miles and covers an area of very narrow beach that may not always exist due to the dynamic beach and water level conditions. Assessing these beach access areas and discussing options with the Michigan Great Lakes Water Trails Working Group will be the next step in enhancing the quality of the Bay to Bay Trail's contribution to the Lake Michigan Water Trail.

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[37] See Appendix C for asset record forms of Bay to Bay Water Trail access points

[38] Lake Michigan Water Trail Association. Bay to Bay Water Trail. http://www.michiganwatertrails.org/trail.asp?ait=cv&cid=132.

[39] Kerry Kelly, Friends of Sleeping Bear Dunes volunteer, email message to U of M Team, March 12, 2014.

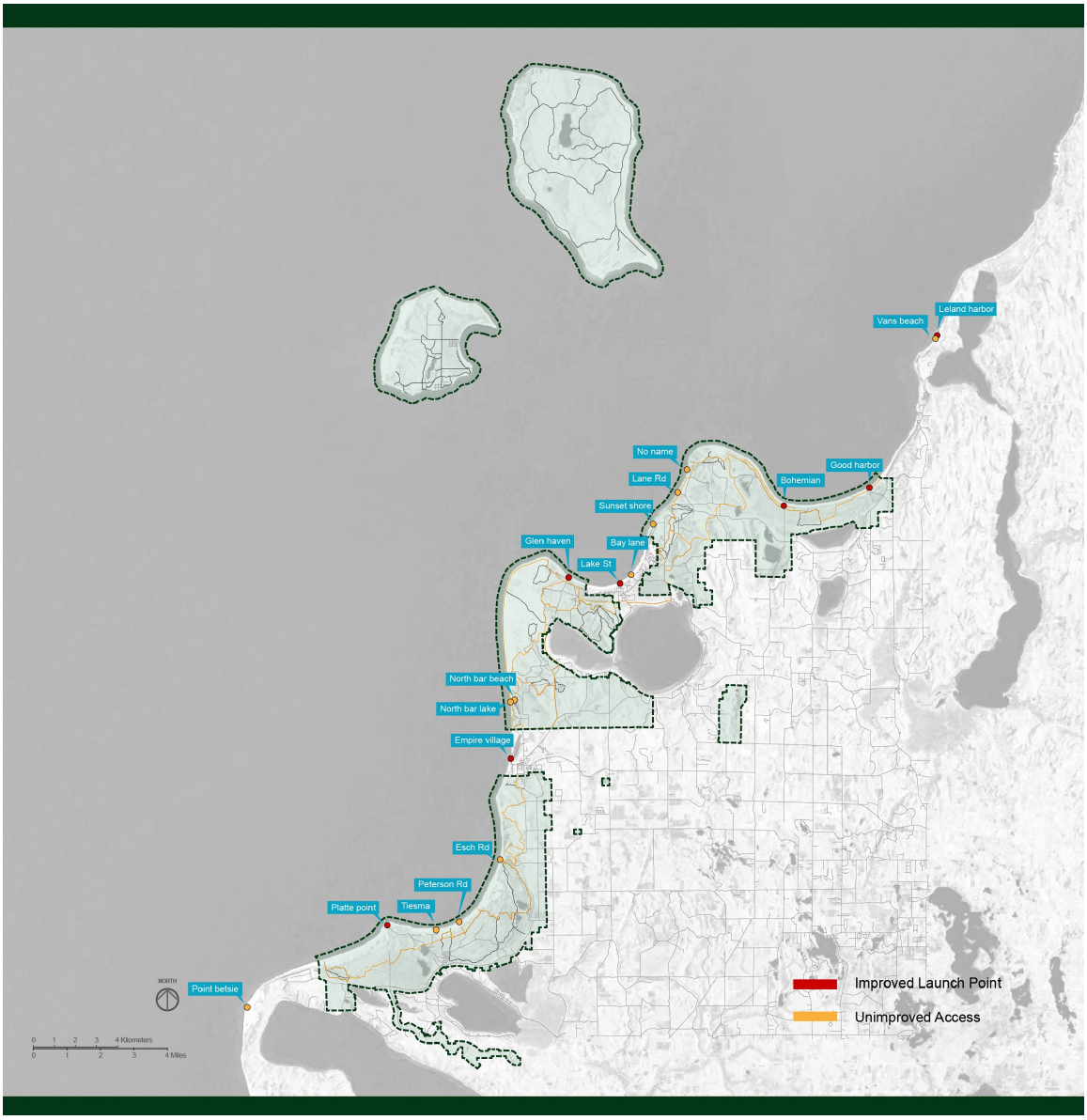

Figure 5. Bay to Bay Water Trail Access Points

The LIAA asset record form (see Appendix D) provided a measurement tool for assessing existing amenities at the water access points. The transformation of the access points into formal launch sites will require some insight into the needs and preferences of paddlers using the Bay to Bay Trail. Included in the Paddler User Survey[40] conducted by the UM masters project team was a question regarding launch site style and layout preferences. Paddlers were

[40] See User Group Surveys section for full results and analyses

asked to select their preferred launch site style from five options.[41] Results of the survey show that most paddlers would prefer launch sites with parking and a short boat carry distance (<100 ft. from parking to the water). Respondents were least supportive of launch sites with long carry distance (>100 ft. from parking to the water). Of the 18 water access point that were surveyed, four of the sites met the short carry distance criteria or included a boat ramp less than 100 ft. from parking.[42] Three of those four had available parking lots on site. Lake Street was the exception with on-street parking.

The next step for the Bay to Bay Water Trail will be to determine which launch points have the potential for additional development in terms of closer parking, amenities, or ADA accessibility (see the Accessibility section for further discussion and siting recommendations of an accessible launch). Paddlers on the Bay to Bay Trail may have different expectations for a launch site in the Park than they would for a launch site somewhere else along the Lake Michigan Water Trail, such as downtown Chicago. To complicate matters more, paddlers may not agree on what features should be present at the Bay to Bay launch sites. Some visitors may prefer a well-equipped launch site with everything from flush restrooms to WiFi, while others may prefer a more remote, backcountry experience with limited amenities. In order to determine whether there are trends among preferences for launch site features, it would be advisable to develop a questionnaire similar to the user group surveys that focuses on launch site amenities. The results of the questionnaire in addition to considering providing different amenities based on the location (remote or more developed) would help to create a series of launch points along the trail that meet the needs and preferences specific to Bay to Bay paddlers.

Superseding the goals of meeting paddler preferences for launch sites is a concern for the overall safety of the water trail experience. The Bay to Bay Trail will likely attract visitors with various boating experience and skill levels. Providing kayak safety information is the first step in helping paddlers prepare for a safe trip. It would be advisable to provide water trail safety guidelines in print format at the Visitor Center and in digital format on the Park, Friends, and Bay to Bay Trail websites. The Park website currently has a kayaking and

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41 1) launch site with a boat ramp or dock, parking available

41 2) launch site with short carry (<100 ft from parking to water), parking available

41 3) launch site with long carry (>100 ft), parking available

41 4) launch site with boat drop off, distant parking available (>300 ft away)

41 5) Road end with parking along the road

42 launch sites meeting the short carry preference: Leland Harbor, Lake Street, Platte Point, Empire Village

canoeing page that has been developed in conjunction with the Coast Guard.[43] This page provides an excellent platform on which to expand upon the specific safety concerns associated with paddling on Lake Michigan. Additional safety guidelines could include information regarding signal devices, hypothermia, recommended equipment, tracking weather and water conditions, and trip planning. The Friends and Bay to Bay Trail websites could make use of this collection of safety guidelines by linking to the Park page.

In addition to providing safety guidelines, it is also essential that paddlers are kept up to date on the local weather and water conditions. As the Bay to Bay Trail becomes the first Park-recognized water trail, it could also serve as an opportunity to evaluate the weather and water conditions information system for the Park. Currently the only medium through which weather conditions are posted is a bulletin board in the Visitor Center. NPS and Friends may consider adding a link to the NOAA marine forecast on the Park, Friends, and Bay to Bay Trail websites. This forecast could also be built in as a component of any future mobile apps created for the trail.

Another option would be to expand the Park Alerts on the Park website to include small craft advisories. Including these alerts on the website could help paddlers stay up to speed on current water conditions. The concern with this option would be the reliance on NPS staff to vigilantly update the Park Alerts. If paddlers are to rely on the website for current conditions, the alerts would need to be current at all times.

A more substantial safety feature for the water trail would be the addition of a flag warning system at the launch sites. This option would have the advantage of providing a direct visual alert to paddlers, but would also require more extensive monitoring and upkeep with changing weather conditions. A flag warning system could easily turn into a safety menace if flags are not promptly changed to reflect conditions. Flags, which could be mounted on standalone poles or incorporated into beach landing signage, could include green, yellow, and red options. Proceeding with this feature would require careful consideration of tradeoffs between unobstructed natural views of the lakeshore and safety. Limiting the flag system to more developed launch sites may be a way to compromise between these issues.

[43] http://www.nps.gov/slbe/planyourvisit/kayak.htm

green flag	**Low Hazard** calm conditions
yellow flag	**Medium Hazard** moderate surf and/or currents
red flag	**High Hazard** high surf and/or currents

Figure 6. Flag Warning System

Flag Warning System adapted from the Gulf Shores & Orange Beach 5 Flag Warning System[44]

The Bay to Bay Water Trail provides the exciting opportunity to create an unprecedented dual hiking and paddling trail in the state in addition to contributing to the Lake Michigan Water Trail development. Launch site analysis and documentation conducted as a part of the project will play a role in the overall goal for the Lake Michigan Water Trail to receive US Park Service national water trail status.[45] If the trail is able to meet this goal, it would join only 14 other water trails across the county with this prestigious status.[46] ❖

[44] Gulf Shores & Orange Beach Tourism. Beach Warning Flags. http://www.gulfshores.com/things-to-do/beach-water/beaches/warning-flags.aspx.

[45] Alexander, Dave. Success of Lake Michigan Water Trail will be tied to Amenities such as Kayak Lock Racks. MLive. February 6, 2014. http://www.mlive.com/news/muskegon/index.ssf/2014/02/success_of_lake_michigan_water.html.

[46] NPS-RTCA and the National Trails System. National Water Trails System. http://www.nps.gov/WaterTrails/Trail.

VII

Accessibility

Providing outdoor recreational and educational opportunities to people of all walks of life, abilities, and backgrounds is of great value to the National Park Service. NPS's policy on accessibility is as follows: "The National Park Service is committed to making all practicable efforts to make NPS facilities, programs, services, employment, and meaningful work opportunities accessible and usable by all people, including those with disabilities."[47]

The Bay to Bay Trail has the potential to provide quality recreational opportunities to visitors with a wide range of abilities. Those seeking a physical challenge as well as visitors with limited mobility will be able to find recreational opportunities that suit their needs. The water trail component in particular opens the trail experience to many who are less mobile on land but find water to be a freeing medium in which to experience the outdoors. In order to meet the founding objective of the trail: to enhance visitors' experience of the lakeshore, the design of the trail and accompanying features must provide for visitors of diverse abilities.

There are a number of ways in which a trail can be inclusive in the types of visitors it serves. Perhaps one of the easiest yet most important ways is to provide accurate and detailed information about the trail segments. Visitors should be able to access information regarding trail segment slope, surface material, and length to help plan trips that are appropriate for their level of mobility and fitness. The trail website, brochure, and maps will help to disseminate this information and make trip planning an easier process. Including slope information on trailhead signage would also be helpful for visitors who find themselves making navigational decisions en route. Results obtained from the campground matrix assessment will also provide information regarding campground accessibility. Factors including campground distance from the lake, distance to the nearest trailhead, and accessibility of adjacent trail segments should be included in Park camping materials. Providing complete information regarding trail and campground conditions not only helps individuals of limited mobility but also aids groups of different abilities plan trips that include shared camping or trail segments.

A key feature of the Bay to Bay water trail is its potential to incorporate a universally accessible kayak launch. The launch must be appropriately sited and constructed to be successful. The site should be highlighted in trail materials to direct disabled visitors to use the launch as their access point. The brochure and website should also include a description of the launch features to prepare visitors for what to expect. In terms of meeting the needs

[47] National Park Service, U.S. Department of the Interior, Accessibility for Visitors, http://www.nps.gov/aboutus/eeo.htm.

of visitors with diverse abilities, providing clear, accurate information about the trail is the most essential step to providing enjoyable experiences.

The Bay to Bay hiking trail will cross a range of landscape types and is composed of various surface materials at different slopes. The majority of the trail would not be considered accessible to wheelchair users or those with limited mobility. There are, however, segments of the proposed route alternatives that would be considered accessible or could be designed in such a way that would open use to less mobile visitors.

The U.S. Forest Service provides trail accessibility guidelines to help measure different factors of a trail that deem it more or less accessible to visitors who are wheelchair bound or have limited mobility. Although not all of these factors may be met in a given trail segment, the guidelines provide helpful benchmarks from which to measure accessibility. The first factor to consider is the trail surface. Surfaces should be firm, meaning that they are able to resist deformation from normally occurring weather conditions, as well as stable, in that they are able to withstand normal wear and tear from expected uses and weathering.[48] The Bay to Bay Trail route alternatives that encompass parts of the paved Sleeping Bear Heritage Trail or certain segments of existing Park trails could qualify as firm and stable. New trail segments and existing social trail segments could be constructed or improved to meet these standards as well.

In addition to the trail surface, the tread width, cross and running slopes must also be considered. In order to adequately accommodate wheelchair users, the tread width of the trail should be a minimum of 36 inches. If the tread width is less than 60 inches, the trail should include passing spaces at 1,000-foot intervals.[49] The running slope (grade) of the trail can be up to 5% for any distance along the trail but no more than 12% in any segment. Trail segments running at 5 to 8.33% slopes should include a rest interval every 200 ft. Segments with slopes between 8.33 and 10% or 10 and 12% should include rest intervals at every 30 and 10 feet respectively. Trail cross slopes should be no greater than 5% and no greater than 2% for paved or elevated trails.[50]

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[48] U.S. Forest Service, Forest Service Trail Accessibility Guidelines, 2013 Update,
[48] http://www.fs.fed.us/recreation/programs/accessibility/FSTAG_2013%20Update.pdf, 8-10.
[49] Ibid., 11.
[50] Ibid.

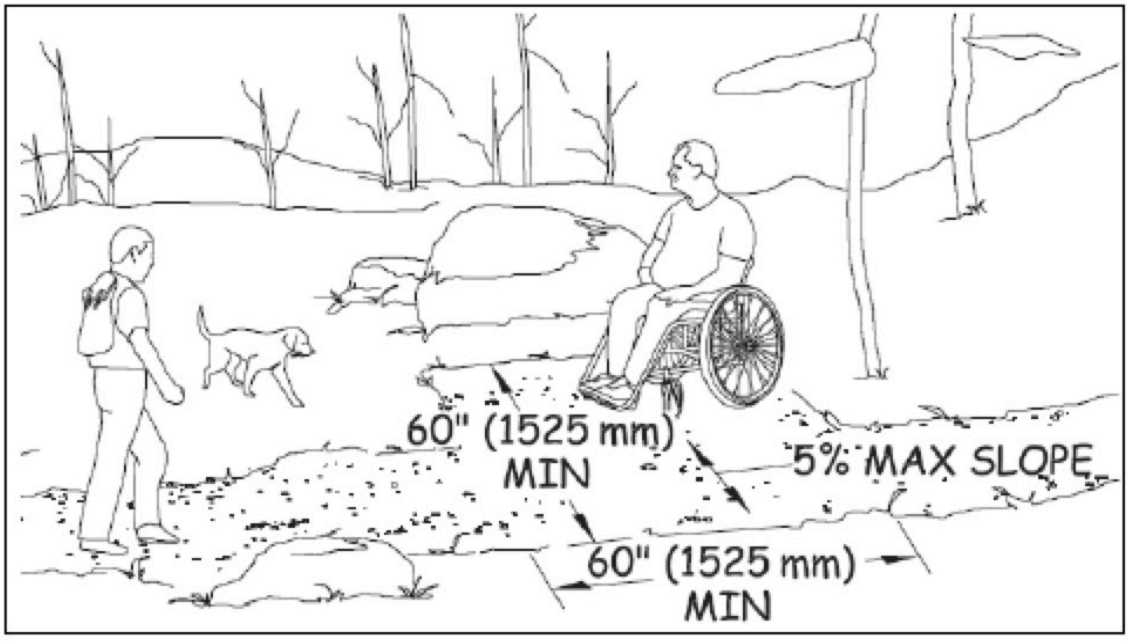

Figure 7. Accessible Trail Dimensions

U.S. Forest Service. Forest Service Trail Accessibility Guidelines. 2013 Update.
http://www.fs.fed.us/recreation/programs/accessibility/FSTAG_2013%20Update.pdf

The Bay to Bay Trail would expand its user group inclusivity best by combining an analysis of trail segment accessibility with appropriate signage and information regarding trail characteristics. During the trail route alternative selection process, the opportunity exists to include accessibility as a decision factor. The three most critical trail characteristics that would aid in determining a segment's accessibility are slope, surface, and length. A trail route with a high potential for accessibility would include segments with low slopes and firm and stable surfaces. The Developed Trail Route alternative would likely have the best potential for accessible segments as it includes the greatest proportion of overlap with the paved Sleeping Bear Heritage Trail.

The Bay to Bay water trail has the potential to open recreational opportunities to a group of users who may be otherwise closed off to many activities in the Park. Wheelchair users, those recovering from hip and knee replacements, and others with limited ambulatory mobility may find boating an easier, more enjoyable way of experiencing the outdoors than other forms of recreation such as hiking or bicycling. Mentally disabled visitors who are accompanied by caretakers may also find water-based recreation to be a preferred way of experiencing the Park. Improved access to the lakeshore would benefit the overall inclusivity of the Park towards visitors of varying abilities.

Simply developing a water trail is not enough to address the issues of accessing the lakeshore. Many of the sites assessed for their potential as launch points along the Bay to Bay Trail lacked nearby parking and accessible walkways. The majority of these sites were located along open bank areas, which would provide little protection from waves. Siting an appropriate location for a launch site that could be used by individuals with limited mobility is a critical first step.

Parking lots (or absence thereof) are often the first barrier to accessing the water. An accessible launch site should have parking adjacent to the water access that includes accessible parking spaces for vehicles and boat trailers. The number of accessible parking stalls provided should also be carefully considered. The minimum number of accessible spots required by law will not account for the fact that the launch site's target users are disabled. The parking lot surface should also allow for easy rolling of kayaks and canoes on carts and should be relatively stable to support boaters with hip and knee replacements.[51]

Getting from the parking lot to the water is the second stage in the water access experience that needs to be evaluated. An ADA accessible route should lead from the parking lot to the boat launch. This route should be a minimum of 12 feet wide to allow for two wheelchair users carrying a canoe between them. The design of the route should also accommodate seasonal take out / put in of the dock and/or launch components if deemed necessary. Minimal slopes along the route should also be a priority and should not exceed 5%.[52]

The launch itself must be specially designed and equipped to provide for the particular needs of disabled users. It would be pertinent to assess the types of physical challenges and disabilities expected within the user group and design in a way that meets those needs as a minimum design standard. The gangways, decks, and boat-boarding (transfer) areas should be ADA compliant and provide guardrails where necessary. The launch should also provide room to maneuver a canoe or kayak as well as a way to steady the boat once in the water. A transfer area that allows for an easy, dry transition from a wheelchair to the boat is a critical feature. Prefabricated modular units such as the EZ Launch® with Accessible Transfer System use a design akin to a boat lift for canoes and kayaks along with a slide board to help disabled users ease themselves into the boat.[53] The type of transfer system chosen should match expected user needs as well as the launch site conditions.

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[51] Brochu, Mark, Kim Haller, and Pam Blough. Universally Accessible Canoe and Kayak Launches, 2009.

[52] Ibid.

[53] EZ-Dock. Floating Dock and Lift Systems, Caro, Michigan, 2012.

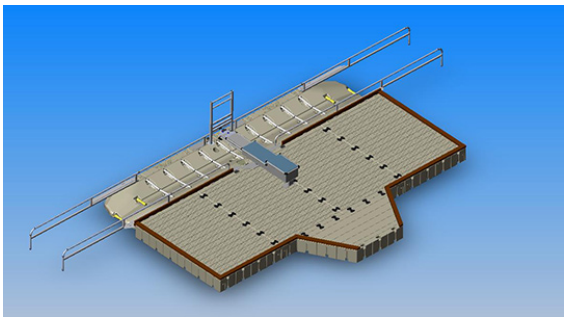

Figure 8. EZ Launch®

EZ-Dock. Floating Dock and Lift Systems, Caro, Michigan, 2012.

Although all features of a good standard launch site apply to those that area universally accessible, there are a number of site amenities that are particularly important for disabled individuals. Picnic tables, ADA accessible toilet facilities, and group staging areas are of greater necessity at these sites. Maps showing the Bay to Bay Trail, surrounding area, and other accessible launches are also of high importance.[54] Finally, signage explaining the operation and rules of the launch is a critical element for the safety and usability of the site.[55]

Recommendations

The Platte Point launch site option seems most appropriate for developing an accessible launch option. Located in Benzie County within the southern Platte District of the Park, Platte Point would provide a calm entry point to Lake Michigan via the Platte River. The site currently includes a developed boat ramp, seasonal flush restrooms (including handicap stalls), benches, 10 picnic pads, and ample parking split between NPS and Lake Township jurisdiction. The site would also have the potential of tying into an accessible water trail segment if accessible launches were developed upstream at Loon Lake or south along the lakeshore in Frankfort.

[54] Brochu, Mark, Kim Haller, and Pam Blough. Universally Accessible Canoe and Kayak Launches, 2009.

[55] Environment Agency. Access for All Design Guide, United Kingdom, 2012.

Figure 9. Platte River Launch Point
Upper: Context Map; Lower Right: Platte River Photo; Lower Right: Platte River Boat Ramp

The preferred siting of an accessible launch would be on the southwest side of the site adjacent to the circle drive. This area would be a first choice because it would provide boaters with some space away from the existing boat launch to the north, which also serves motorized boats. This site also serves as the current canoe and kayak livery pick-up for rentals, which would be an asset to an accessible launch. The second choice would be immediately west of the boat ramp. This location would have the disadvantage of being further away from the picnic pads and restrooms and would be closer to heavier traffic and motorized boats.

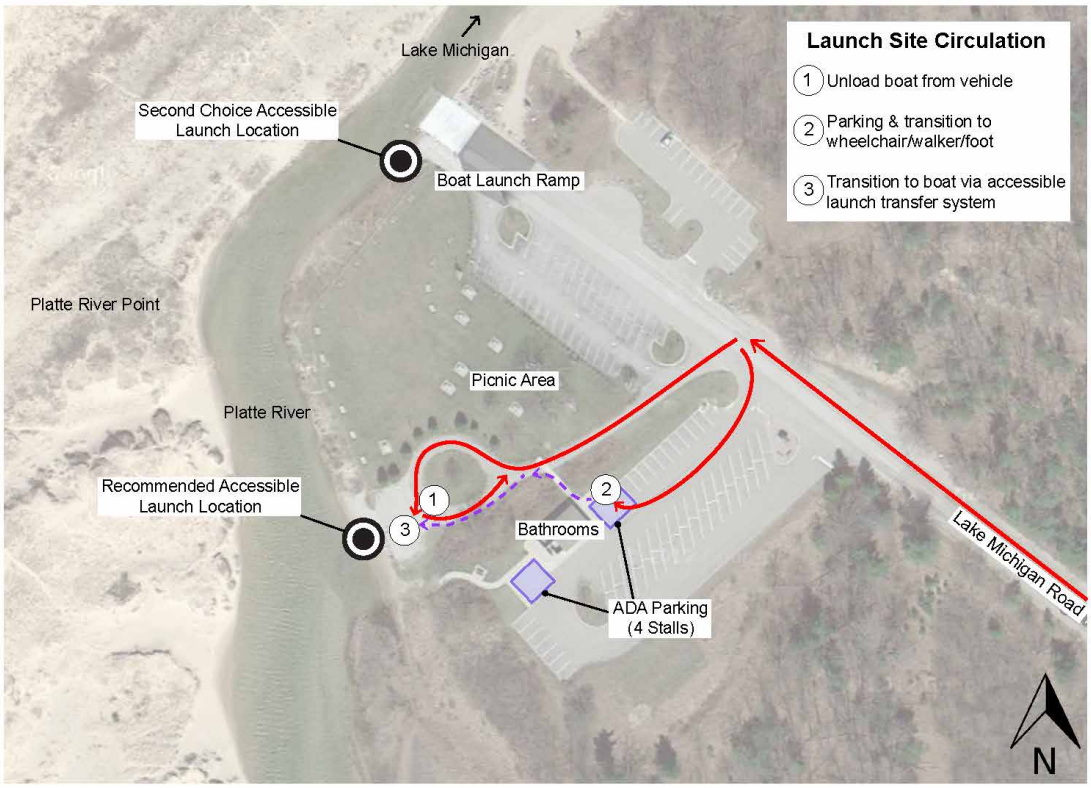

Figure 10. Site Inventory with Circulation

The circulation and condition of the first choice site would be adequate in its current state, but could be improved upon to create a safer, more enjoyable experience that meets important design considerations for accessible launch sites. Additional ADA parking stalls should be incorporated into the lots to account for the increase in handicap visitors to the site. A group staging area including ADA friendly picnic tables and a small shelter to the north of the circle drive would allow groups to gather and plan before heading out on the lake. Signage regarding regulations, the launch operation, and maps could also be posted within this area. In order to improve the transition between the parking lot and the launch, it would be advisable to extend the paved walk on the south side to use as a primary route. A secondary route around the north of the circle drive could also extend from the crosswalk to the staging area. The space between the circle drive and the beach would require hardscaping as well.

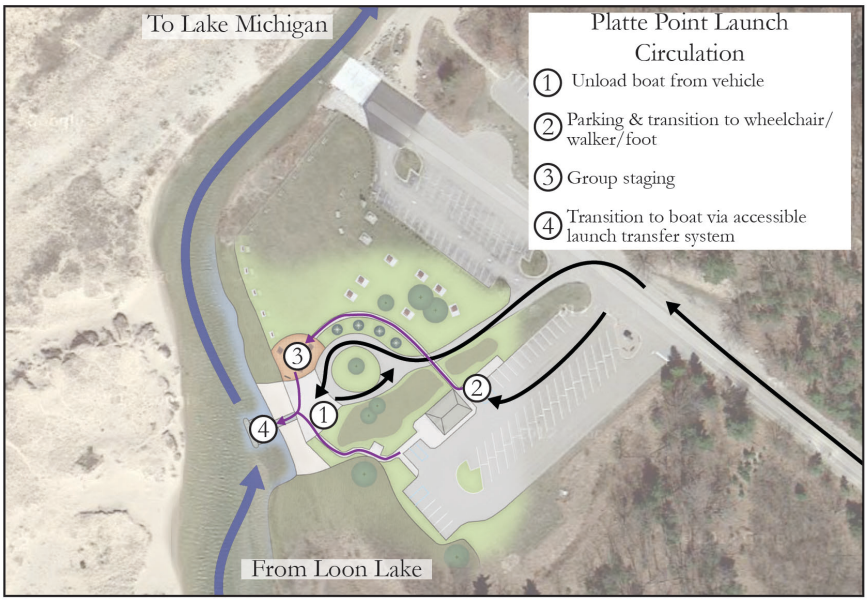

Figure 11. Plan View of Site and Circulation

The launch style and make would require NPS assessment, but a style similar to the EZ Dock® EZ Launch®, Drive through with ports, large dock and bench would meet the needs of the site. A two-way port system would allow for boats coming down the river to land and would help tie in a potential accessible launch at Loon Lake to an accessible water route. Additionally, incorporating a boat trailer parking stall with an access lane in the north parking lot would also provide better access for disabled visitors using their own boat trailers.

Figure 12. Platte River Photos

Left: Loon Lake; Middle: Boat Ramp; Right: Bench Lawn

Figure 13. Launch Point Plan View

Figure 14. EZ Launch® Photo

EZ-Dock. Floating Dock and Lift Systems, Caro, Michigan, 2012.

The Platte Point launch site an excellent opportunity of opening access to the Bay to Bay Trail and Lake Michigan to all users. Creating accessible trail segments and boat launches will improve the trail's accessibility, but providing clear information about surfaces, slopes, and difficulty levels on maps and in trail materials, will ultimately determine whether the trail is inclusive for visitors of all abilities. ❖

VIII

Campgrounds

With the addition of the hiking and water trail components of the Bay to Bay Trail comes the need to provide visitors with more camping accommodations. Not only will the Park likely see an increase in the number of campers, but the trail will also bring visitors to parts of the Park absent of campgrounds.

Planning for additional campground development does not come without concerns about associated environmental impacts. Some of the environmental consequences often linked to campsites include loss of vegetation, soil compaction, and presence of litter and human waste.[56] On March 4, 2014, the House unanimously passed a bill that establishes 32,500 acres within the Park as designated wilderness.[57] The designation will ensure that the natural features of this area will be protected and as a result may have some impact on campground construction. In addition to the wilderness designation, proper design and management of campgrounds can be used minimize environmental impacts.

Six sites were identified for potential new campground development or campground expansion. The identified sites vary in terms of their remoteness and the degree to which they would be primarily serving paddlers or backpackers. During the May-July 2013 fieldwork session, the current conditions of these sites were assessed for their development potential. A campground evaluation form (see Appendix H) was created to document existing conditions at each of the sites. Some of the elements recorded include the latitude and longitude location, a description of the terrain, a ranking of the degree of shelter the site provides from the elements, the distance from the nearest trail, and a record of existing amenities (e.g. toilets, potable water).

In addition to completing the campground evaluation forms, GPS points were dropped at each of the sites. These points help to give a visual representation of potential campground locations and qualities, which will be helpful when selecting a trail route alternative. Recording the precise location of each site was also useful in determining whether the water trail component could meet the standard of a maximum of 10 miles between campsites as set by Lake Michigan Water Trail guidelines.[58]

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[56] Drekich, Danielle. "Assessing Visitor Use Impacts to Natural Resources and Creating Restoration Recommendations for North Manitou Island Sleeping Bear Dunes National Lakeshore." Capstone Masters Project, University of Michigan, 2012, 9.

[57] Bernstein, Lenny. "Congress passes bill to protect Michigan's Sleeping Bear Dunes as wilderness area." The Washington Post, March 4, 2014. http://www.washingtonpost.com/national/health-science/congress-passes-bill-to-protect-michigans-sleeping-bear-dunes-as-wilderness-area/2014/03/04/89c0dc34-a3ee-11e3-a5fa-55f0c77bf39c_story.html.

[58] Kerry Kelly, Friends of Sleeping Bear Dunes volunteer, email message to U of M Team, March 12, 2014.

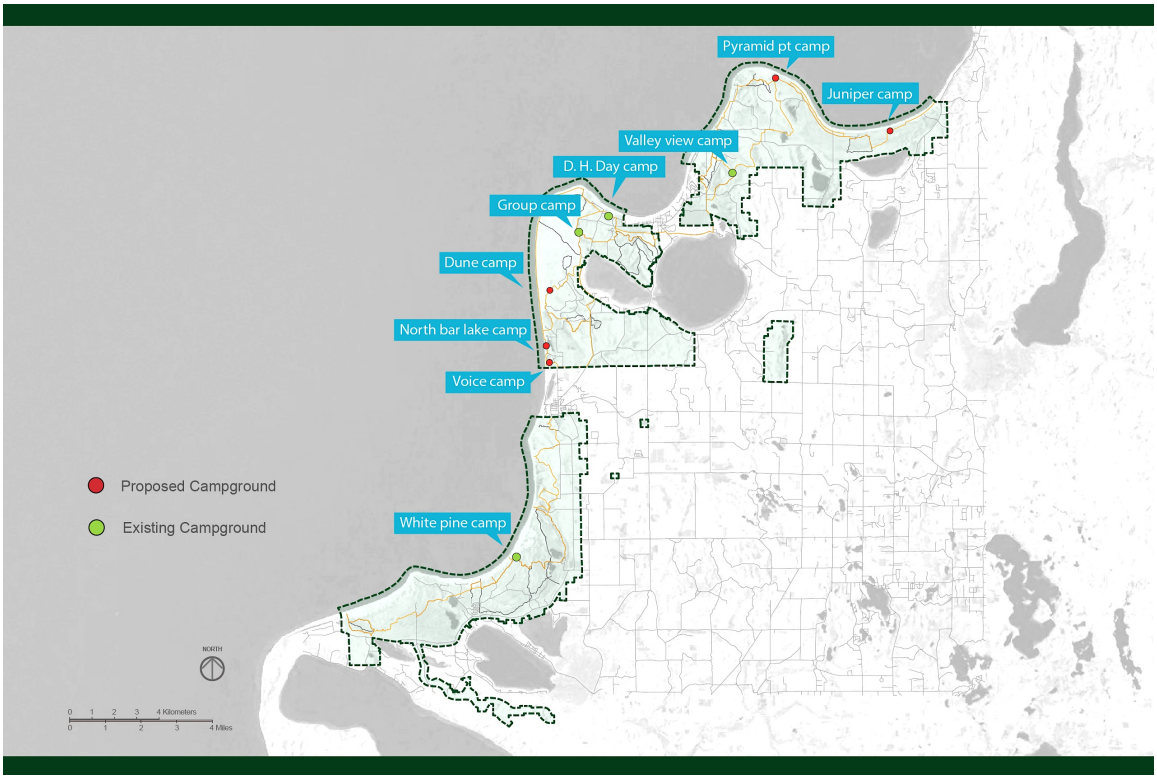

Figure 15. Bay to Bay Campgrounds

Following the initial site conditions assessment, a more comprehensive analysis tool was developed to evaluate the sites in the form of a campground matrix (see Appendix E). The purpose of developing the matrix was not only to provide a standardized method of evaluating and ranking potential campgrounds for the Bay to Bay Trail but to also create an assessment tool that the Park could use for other existing and future campgrounds.

Each specific campground location (some proposed sites had up to three specific potential locations) was processed through the matrix based on data documented in the campground evaluation forms and knowledge about the sites from rangers and Friends volunteers. The evaluation factors include number of campsites, distance to trailhead, ADA accessibility, drainage, privacy, soundscape, distance from Lake Michigan, water availability, cell phone reception, target users, protection from wind, archeology, soil type, sun exposure, and environmental impacts (refer to Appendix D for factor definitions and ranking options). Each factor ranking is scored as A (preferred), B (adequate), and C (not recommended). Although ranking the factors provides the ability to compare the suitability of two campground options, the scoring mechanism may not work in all cases. Different users will perceive some factors, such as water availability and cell phone reception, differently. Some

visitors will seek a sense of solitude and a remote, rugged experience of the trail and may wish to remove themselves from these amenities during their trip. Others will appreciate fully equipped campgrounds.

In order to design and outfit the campgrounds in a way that aligns with the expectations of future trail users, it would be wise to revisit the backpacker and paddler user group surveys. Results from both surveys show that a sense of solitude is an important quality for campgrounds. This preference trend should be acknowledged when deciding what amenities to include at different campground sites. Prospective backpackers noted that they prefer campsites in the woods or along the foredunes while the paddler survey respondents reported that they preferred campsites on the beach (300 ft from the water), along the foredunes, or in the woods. The overlap in location preferences suggests that campgrounds could successfully serve both types of trail users depending on the selection of the hiking trail route.

The recent wilderness designation will also have an impact on the types of amenities allowed at campgrounds within this area. Campground development will essentially be capped at a backcountry design; electrical hook-ups and potable water will not be offered at these sites. Regulations prohibiting power tools and motorized vehicles will likely make the construction of vault toilets unfeasible. Pit toilets may be a more practical alternative.

In order to help visualize the proposed campgrounds and consider management techniques, three layout designs were developed. The different designs may be more or less appropriate for different sites, but all have a common goal of minimizing disturbances and impacts on the landscape.

Designated campsites attempt to mitigate environmental impacts by concentrating impacts to strictly defined areas. Campsites would be designated by tent pads with connector paths. This design style would be most appropriate for campgrounds in less remote areas with sensitive landscapes nearby. Some of the sites proposed for expansion, such as D.H. Day, may be a particularly good fit for this design tactic.

Figure 16. Designated Campsites

Another option to employ at some of the proposed campground sites would be dispersed camping zones. This campground style is currently used on North Manitou Island and entails delineated zones where camping is permitted. Zones would be set 300 feet back from the high water mark to protect water resources from contamination coming from camper latrines and cooking waste.[59] Setting the camping zones back from the water also helps to ensure that campsites are within the tree line to preserve natural views of the lakeshore.[60] This design style attempts to address environmental impacts by dispersing campsites within the zone. Studies have shown, however, that visitors tend to use the same sites year after year resulting in the concentrated impacts that the design sets out to avoid.[61] For this reason, the design may be most suitable for smaller, remote campgrounds without highly sensitive landscapes.

Figure 17. Dispersed Camping Zones

[59] Drekich, Danielle, "Assessing Visitor Use Impacts to Natural Resources and Creating Restoration Recommendations for North Manitou Island Sleeping Bear Dunes National Lakeshore" (Capstone Masters Project, University of Michigan, 2012), 28.

[60] Ibid., 29.

[61] Ibid., 6.

A third option, which may alleviate some of the issues of dispersed camping zones, would be rotational-use campsites. Campgrounds would be composed of (ex. 4 to 5) campsites of which (ex. 2 to 3) could be occupied at a time. Campsite availability would rotate to reduce concentrated impacts. This design may be most appropriate for medium-sized campgrounds in remote areas with sensitive landscapes. A disadvantage of this style would be the requirement of significant planning in campground reservations. The rotation may also prove to be difficult to enforce. Educating campers on the reasoning behind the rotational availability of campsites would be essential.

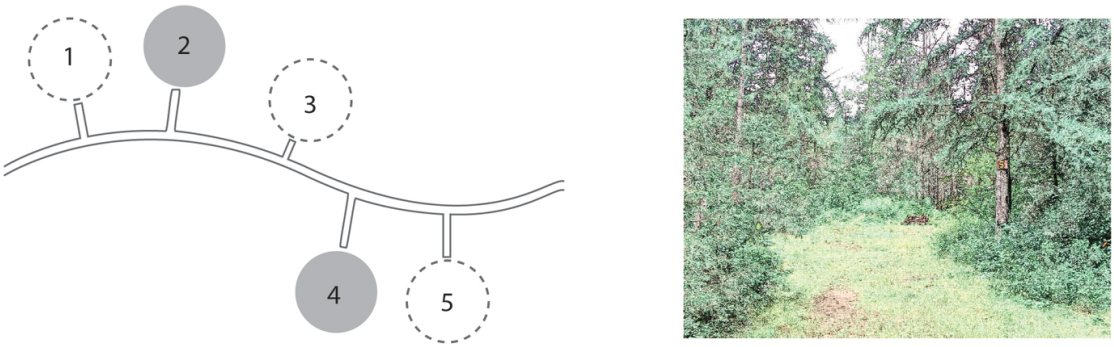

Figure 18. Rotational-use Campsites

Potentially one of the greatest challenges of the trail may be the reservation process for campgrounds serving Bay to Bay Trail users. A significant anticipated problem is that non-trail users will reserve these campsites, park at the nearest trailhead and walk in. A lack of campsite availability could be very discouraging especially to paddlers who may be coming from a distance along the Lake Michigan Water Trail.

A potential solution to this problem could be to require visitors to register as Bay to Bay Trail users either online or in person at the Visitor Center or Platte River campground. A print out or email documentation could serve as a permit for using the campsites. The registration process would have an additional benefit of helping the Park track visitors using the trail and campgrounds for safety and campground capacity monitoring.

Campgrounds will be essential in merging the water and backpacking components of the trail. They will serve as a common gathering place for groups using both parts of the trail, and will play a major role in the trail's contribution to the Lake Michigan Water Trail. Thoughtful design techniques and amenity provisions will ensure that these sites provide an enjoyable experience for trail users while protecting natural resources. ❖

IX

Wayfinding

Finding one's way is a universal human behavior that goes beyond culture and language.[62] As Wayne Hunt in *Designing and Planning Environmental Graphics* puts it,

> Wayfinding consists of creating the tools to help visitors find their way to and through [...] spaces. Wayfinding is the science of organizing and defining a sequence of posted messages and communication elements designed to promote self navigation.[63]

The visitor experience of the Bay to Bay Trail relies heavily on the quality of the trail's wayfinding system. Informational materials, maps, and signage all play a critical role in getting people to the trail, helping them navigate through it, and providing background information to experiences along the way. It would be advisable to address trail wayfinding as a hierarchical system. Each piece from the website to directional signs should be cohesive, belonging to the same family, but include different information according to the decisions being made at the point of viewing.[64] A suite of schematic designs for wayfinding products was developed to provide ideas for trail signage, a brochure, and a website.

Signage for the Bay to Bay Trail must be addressed two-fold. Different modes of transportation along the hiking and water trail segments will necessitate different approaches. Hiking trail signage can conform to traditional signage standards as it will serve visitors on foot, while the water trail signage will need to accommodate visitors offshore in kayaks or behind the wheel en route to a launch site.

Properly siting signage will be the first critical step in creating a successful system. Following the completion of the EA and selection of a trail route, it would be wise to conduct a signage placement survey. Understanding the most common origins and destinations as well as key navigational decision points and natural landmarks along the trail will be essential to locating the best site.[65] An understanding of the different modes of travel and transitions between these modes (e.g. vehicle to foot, foot to kayak, wheelchair to kayak) will also require thoughtful consideration. Sign viewing time, which will be most constrained for drivers,

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[62] Raphael, David. Wayfinding: Principles and Practice, Landscape Architecture Technical Information Series, Washington, DC: the American Society of Landscape Architects, 2013, 1.

[63] Hunt, Wayne. Designing and Planning Environmental Graphics. New York: Van Norstrand Reinhold, 1994.

[64] Raphael, David. Wayfinding: Principles and Practice, Landscape Architecture Technical Information Series, Washington, DC: the American Society of Landscape Architects, 2013, 8.

[65] Ibid.

should be a major component when making decisions regarding typefaces, sign contrast, and layout.[66]

The primary question regarding the trail's signage style is whether it should be distinctive, similar to the Sleeping Bear Heritage Trail, or basic, conforming to styles used in the backcountry. Simplistic signage, as is used in remote parts of the Park, would have the advantage of minimizing the sign's impact on visitors' experience of the lakeshore. This style may be most fitting for remote parts of the trail and backcountry campgrounds. Distinctive signage would have the benefit of enhancing the unique identity of the trail and may be best for frontcountry segments and trailheads.

It may be best to consider using both simplistic and distinctive signage types for the trail, siting each style in its appropriate context. Regardless of the styles used in the signage system, each sign should have an element of consistency to notify visitors that they are on the Bay to Bay Trail. A logo, color, or other type of identifier should be present on all signs to help with navigation. Many of the route alternatives include intersections with existing loop trails. It could be quite easy to get off track onto a loop trail without clear and consistent signage.

[66] Ibid., 9-16.

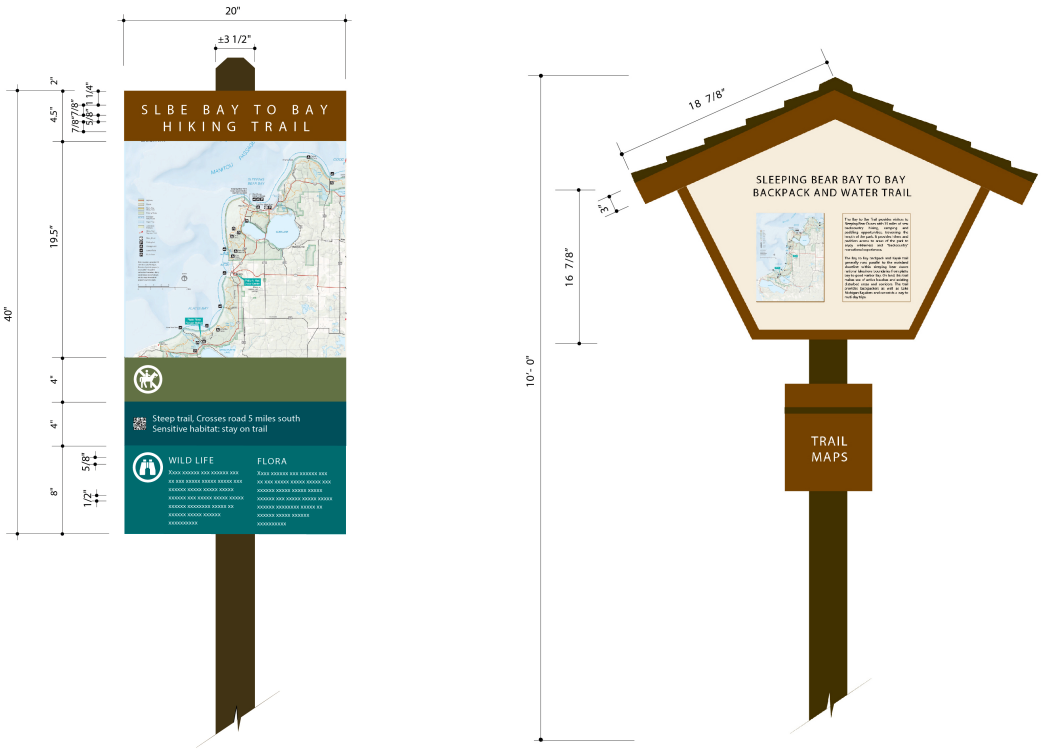


Figure 19. SBHT Signage (Left) and Backcountry Signage (Right)

The sign plan developed for the Sleeping Bear Heritage Trail (SBHT) in 2011 provides an excellent template from which to base parts of the future Bay to Bay Trail signage system. Conforming to styles used in the SBHT trail will also benefit the movement toward park-wide signage system redevelopment. The goals of the SBHT sign plan match the needs of a future Bay to Bay Trail signage system, further warranting a reuse of the style. The most prominent goals of the sign plan are standardization, consistency, and preservation of the natural beauty of surrounding landscapes. In order to have a minimal impact on views and the remote experience, signs must be clear, concise, properly sited, and attractive.[67]

The following images show designs for Bay to Bay Trail signage conforming to the SBHT Sign Plan standards.

[67] Nelson-Jameson, Barbara. Sleeping Bear Heritage Trail Sign Plan. NPS-RTCA-Michigan, 2011.

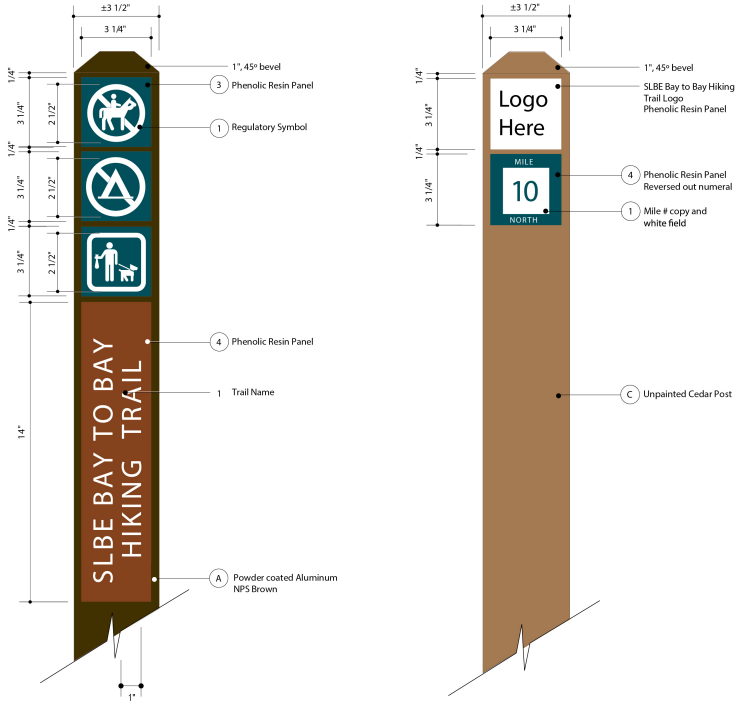


Figure 20. Bay to Bay Signage

Left: Hiking Regulation

Right: Mile Maker

Figure 21. Bay to Bay Signage

Backcountry Directional Sign

There are three main components to water trail signage: road directional signs, launch site entrance signs, and boat landing signs. Road directional and launch site entrance signs will be viewed by drivers and will need to conform to MDOT Traffic & Safety Division standards. The signs should be clear, concise, and indicate the trail's connection to the Lake Michigan

Water Trail via text or logo. Since these signs will be placed on the roadside, they may need to deviate from the SBHT sign plan standards. A sign plan for the Blue Trails in Georgia provides guidelines for roadway signage specific to water trails.[68] Combining these guidelines with MDOT standards and SBHT sign styles will help to create a functional, aesthetically pleasing roadway signage plan for the water trail.

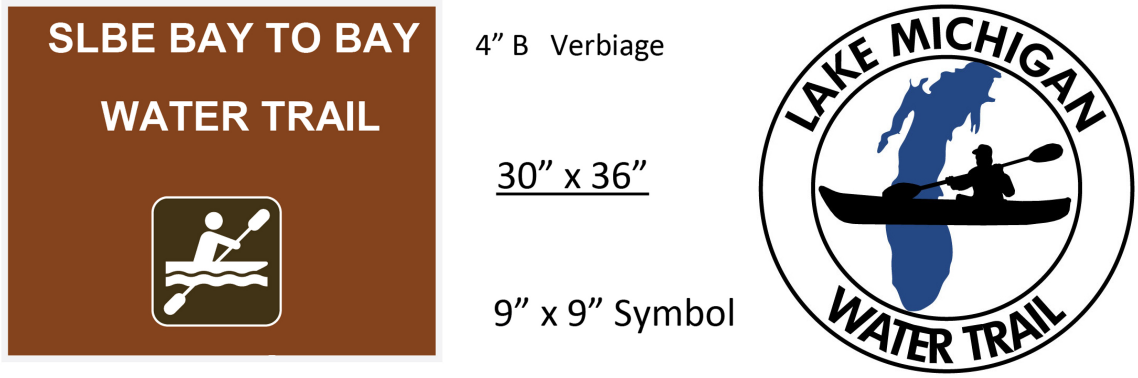


Figure 22. Signage
Left: Launch Site Entrance Sign; Right: Lake Michigan Water Trail Logo

Perhaps the most difficult component to design for the wayfinding system is the water trail landing signage. These signs will face the lakeshore and will alert paddlers to the presence of a landing/launch site. A number of special concerns are tied to this signage including visibility, obstructing natural views of the lakeshore, and dynamic sand and water levels. Creating a sign that is visible during times of low light and inclement weather is a challenge. One option for enhancing the visibility of signs includes using a prismatic high intensity (retro-reflective) sheeting type for sign text.[69] This option would be helpful for paddlers who find themselves looking for a landing site in low light or poor visibility conditions. The significant disadvantage of this option is that it would require paddlers to shine a headlamp or flashlight along the shoreline to find the sign to make use of its retro-reflective quality. Recommending that paddlers carry a light could be a work around, but this option would rely heavily on paddler preparedness.

With any option, the sign color, typeface, and distance to the shoreline will require careful consideration when creating and siting the signs. Using colors such as orange, red, or brown

[68] Gillis, Charlotte. A Roadway Sign Package for Blue Trails in Georgia. NPS-RTCA-Georgia, 2011.

[69] Ibid.

that contrast with vegetation or sand would be an additional design technique that could boost visibility. Each landing location should be assessed individually to determine the best location for the sign. Sand and water levels as well as estimated paddler distance from shore will vary from site to site. The distance of the sign from the water will then inform the text and/or symbol size selection to ensure readability.

The lakeshore is the showcase feature of the Bay to Bay Trail and should therefore be a protected view. Landing signage will unavoidably alter the view of the lakeshore to some degree, but thoughtful signage design may make its presence less offensive. The two options that seem to have the most precedent in water trail signage success are carbonite signposts[70] and traditional sheet signs[71]. Carbonite posts with symbols may have the advantage of being more resistant to the elements, but would lack the visibility of a sheet sign. Sheet signs would have the additional advantage of providing more information in the form of text but would also make more of an impact on lakeshore views. Each option has potential problems as well as benefits. It may be advisable to incorporate both styles into the signage system: using the less obtrusive carbonite posts at remote landings and the sheet signs at developed sites.

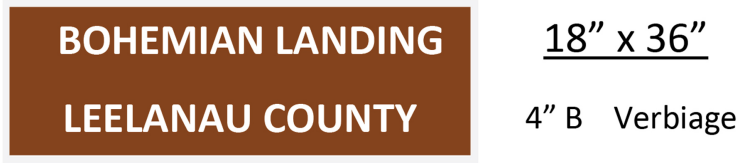


Figure 23. Water Trail Landing Signage (Blue Trails style, Carbonite)

In addition to providing navigational signage, it will also be important to provide visitors with information before they head out on the trail. Although the popular medium of today is undoubtedly digital, there is still a high value in providing portable, paper-based information about the trail. Offering a waterproof version of the brochure with a map focus may be particularly helpful for paddlers. A mock-up of a brochure has been developed to provide visitors with a portable map and information about the trail (see Appendix F). The brochure will serve to promote the trail, provide general background information, aid visitors with trip planning and campground reservations, and provide essential safety principles for hiking and paddling.

The format, layout, and general categories of information provided in the brochure mock-up

[70] Washington Water Trails Association re: Cascadia Marine Trail, phone call with U of M Team, September 9, 2013.

[71] Gillis, Charlotte. A Roadway Sign Package for Blue Trails in Georgia. NPS-RTCA-Georgia, 2011.

will be usable for a final version. Areas that will need to be updated once a trail route has been selected include the map showing the route, text describing specific features of the trail, and photos depicting scenes along the trail. The brochure should be available to visitors at the Visitors Center, trailheads, and as a PDF version on the Park website.

Another dimension of a successful wayfinding system is a website that provides visitors with information before they set off on the trail. The website will provide a source of more comprehensive information about the region, trail, campgrounds, water activities, launch sites and means of reserving campgrounds. The website would essentially to be a one-stop shop for planning a trip along the Bay to Bay Trail.

A mock-up version of the website has been created mockup website (see Appendix G), which includes pages such as Home, Who We Are, Photo Gallery, Plan Your Trip, Interactive Trails, Trail Regulations, Contact Us and an interactive section for blogs and visitor experiences.

The Home, Who We Are and the Photo Gallery elements will provide general background information and photographs of the Bay to Bay Trail. The Plan Your Trip, Interactive Trails, and Trail Regulations will seek to provide potential visitors more in-depth information on the hiking trail segments, backcountry campgrounds, water trail and access points, trail and wilderness regulations, downloadable brochure and interactive trail maps, and campground reservation guidelines. The Contact Us and Visitors sections will facilitate contact and information sharing between trail managers and the general public.

The final version of the website will most likely not be housed or hosted by NPS but rather with Friends or a similar organization. One major area that will require further work is the Interactive Trails section. Once the hiking trail route has been determined, this section can be developed to include the route of the trail, distances to travel, launch points, barriers in the landscape, points of interest, photos, and nearby campgrounds. Additionally, the Visitors section will work as a forum and will require monitoring. The website host will need to create a plan for the upkeep of this section. Finally, the development of the website should be meet the needs of its target audience. This will directly feed into both the aesthetics of the website such as the color schemes, fonts, and photos as well as the more technical aspects such as the interactive nature of the maps.

In terms of sequencing wayfinding information for visitors of the Bay to Bay Trail, the website would be the first source of comprehensive information. The brochure would serve as a portable form of information, and the signage will provide guidance to visitors while they experience the trails.

In conclusion, developing a wayfinding system that provides visitors with clear and comprehensive information about the trail is an essential part of the project development. Visitors should be able to easily access and make use of the different wayfinding products for trip planning, general information, safety, and navigation. The proposed suite of wayfinding products will help contribute to a complete system that provides for these needs. ❖

X

Conclusion

This project has aimed to contribute to the Bay to Bay Trail through data collection, findings, and analysis associated with the requirements of the EA process. The contributions of the project also extend to idea generation and conceptual designs for trail materials and recommendations for next steps in the planning and development phases.

Data for the EA was divided into spatial and public input categories. Spatial data was collected for trail alternatives and key features, water access points, and campgrounds. GPS/GIS and written assessments were used for documentation. Analysis of the spatial data involved accessibility assessments, identification of trail route alternatives, and predictions of visitor experiences. Additionally, cost analyses and the campground matrix were developed as tools for the next steps in trail planning.

The public input data was collected through backpacker and paddler surveys and stakeholder interviews. This data and associated analyses can be used to determine trail and campground preferences and may help to gage community support for the project. Interview findings may be particularly helpful in forecasting how the trail could affect the local economy and what types of visitors to expect.

The products produced by this project encompass the findings and recommendations the team has developed over the past 15 months. The website and brochure mock-ups will serve as a base for developing visual and descriptive information about the trail. This report will further serve as documentation of the methods, findings, analyses, and recommendations for future reference.

Specific site recommendations such as backcountry campgrounds and the accessible launch site at Platte Point may serve as important starting points for further project development and EA work. The partnership between Friends and NPS will be important in analyzing the potential development of these sites and others in terms of anticipated environmental impacts, construction feasibility, and costs. The project's GIS-based maps depicting the alternative trail routes will also provide a baseline for further analysis. The accuracy of the layers, depth of documentation, and connection to a future impact analysis will need to be investigated and amended as needed. Although the project has generated important materials for both the EA and general trail development, much of the work will serve as a foundation for further research, analysis, and design.

In completing this project, our knowledge of landscape architecture and conservation ecology within the context of the National Park Service has broadened greatly. We hope that our skills in these areas have aided the progress of the Bay to Bay Trail project and that our work will be of value to the Park

Appendices

A. Survey Questions

UserSurvey_Backpacker

Project Title
Bay-to-Bay Trail, Hiking and Backpacking Questionaire

Purpose
This questionnaire seeks your input for the planning and design of the Bay to Bay Trail – a 35 mile hiking/paddling trail along Sleeping Bear Dunes National Lakeshore. We hope to better understand your hiking and camping preferences and experience to help guide our design and management of the trail route and campground facilities.

Background Knowledge
The Bay to Bay Trail will provide visitors to Sleeping Bear Dunes with 35 miles of new backcountry hiking, camping, and paddling opportunities, traversing the length of the Park. It will provide hikers and paddlers better access to areas of the Park to enjoy a wilderness and "backcountry" recreational experience, connect the backcountry campgrounds, and identify new campgrounds which could also be used by kayakers. Working with stakeholder groups, the project team will also identify possible locations for adaptive kayak launches and campsites for mobility impaired visitors. The Bay to Bay water trail will be part of the Lake Michigan Water Trail, a four state effort to create a 1,640 mile contiguous water trail along the Lake Michigan shoreline.

Procedures
This survey contains 21 questions. The average time for completion of the survey is 15 minutes or less.

Participation
Participation is voluntary and if you have any questions about this questionnaire or the project, please feel free to contact Kerry, Han-Yu, or Shuting.

Contact Information
Kerry: kerryjkelly7@gmail.com
Han-Yu: alexhyc@umich.edu
Shuting: shutingw@umich.edu

UserSurvey_Backpacker

***1. How long have you lived in the area?**

- [ ] year round resident
- [ ] vacation home resident
- [ ] visitor

Other (please specify)

***2. Where do you live in relation to Sleeping Bear Dunes?**

- ◯ Within 10 miles
- ◯ Within 30 miles (includes Traverse City Area)
- ◯ Within 100 miles
- ◯ Within Michigan
- ◯ Wisconsin
- ◯ Indiana
- ◯ Ohio
- ◯ Illinois

Other (please specify)

***3. What level backpacker would you consider yourself?**

- ◯ Beginner
- ◯ Novice
- ◯ Intermediate
- ◯ Advanced
- ◯ Expert

UserSurvey_Backpacker

***4. How often do you backpack in a year?**

- ◯ 1~3 times
- ◯ 4~6 times
- ◯ 7~9 times
- ◯ 10~12 times
- ◯ over 12 times

If it is over 12, how many times a season?

***5. How often do you day hike in a year?**

- ◯ 1~3 times
- ◯ 4~6 times
- ◯ 7~9 times
- ◯ 10~12 times
- ◯ over 12 times

If it is over 12, how many times a season?

***6. What ratio of multi-day trips to day trips do you usually do in a year? (multi-day trips times/ day trips times)**

***7. Do you see yourself using the trail (hiking or water) if it were to be built as proposed?**

- ◯ yes
- ◯ no
- ◯ maybe

***8. What experience would you be hoping for when hiking? (may select more than one)**

- ☐ wilderness hiking/camping experience
- ☐ challenge hiking/camping experience
- ☐ moderate hiking/camping experience

Other (please specify)

UserSurvey_Backpacker

***9. What resource characteristics would you be hoping for when hiking? (1 is very important and 3 is not important)**

- scenic views
- access to the beach
- diversity of landscape

***10. What type of trip would you imagine taking on the trail?**

- multi-day trip spanning entire National Lakeshore
- day trip for part of National Lakeshore
- multi-day trip for part of National Lakeshore

Other (please specify)

***11. How many hours would you expect to hike per day?**

- 0~2 hours
- 2~4 hours
- 4~6 hours
- 6~8 hours
- over 8 hours

***12. Would you expect to use both the hiking and water trail during the same trip?**

- Yes, I would expect to use both trails.
- No, I would expect to use only hiking trail.
- No, I would expect to use only water trail.
- No, I would not expect to use any trail.
- Maybe.

UserSurvey_Backpacker

***13. How would you like to view information about the trail? (may select more than one)**

- [ ] Online (interactive map)
- [ ] Mobile app
- [ ] Paper brochure/map
- [ ] On-trail posted map
- [ ] Maps at headquarters site

Other (please specify)

UserSurvey_Backpacker

***14. On a scale of 1 to 5 (1 being not desirable to 5 being most desirable), please rank your preference for the following landcovers and trail types for the Bay to Bay hiking trail.**

	1	2	3	4	5
Beach	◯	◯	◯	◯	◯
Dunes (steep slopes on sandy surface)	◯	◯	◯	◯	◯
Woodland (flat)	◯	◯	◯	◯	◯
Woodland (steep)	◯	◯	◯	◯	◯
Fields	◯	◯	◯	◯	◯
Mowed trail	◯	◯	◯	◯	◯
Paved	◯	◯	◯	◯	◯
Two-track/ dirt trail	◯	◯	◯	◯	◯

UserSurvey_Backpacker

***15. On a scale of 1 to 5 (1 being not desirable to 5 being most desirable), please rank your preference for the following campground amenities along the hiking trail.**

	1	2	3	4	5
Vault toilets	◯	◯	◯	◯	◯
Potable water	◯	◯	◯	◯	◯
Food/pack locker	◯	◯	◯	◯	◯
Boat rack	◯	◯	◯	◯	◯
Solar cell phone charging station	◯	◯	◯	◯	◯
Canopy shelter	◯	◯	◯	◯	◯
Access to parking	◯	◯	◯	◯	◯
Interpretive signs	◯	◯	◯	◯	◯
Fire pit	◯	◯	◯	◯	◯
Directional maps, signs	◯	◯	◯	◯	◯
Pack in/ Pack out garbage regulations	◯	◯	◯	◯	◯
Garbage & recycling receptacles nearby	◯	◯	◯	◯	◯
Good exposure to south/sun	◯	◯	◯	◯	◯
Flat surface to set up camp	◯	◯	◯	◯	◯
Privacy	◯	◯	◯	◯	◯
Solitude	◯	◯	◯	◯	◯

UserSurvey_Backpacker

***16. How important is a remote campsite to your camping experience?**

I would prefer a remote,wilderness experience. The farther from the road the better.				I would like to be close to roads for ease of access.
◯	◯	◯	◯	◯

***17. How important is proximity of the campsite to water?**

Not very important. I would be fine with carrying in my own water.				Very important. I would like the campsite to be as close to the water as possible.
◯	◯	◯	◯	◯

***18. What type(s) of campsites would you prefer? (may select more than one)**

- ☐ beach camping
- ☐ platform camping
- ☐ backcountry woods
- ☐ sunny/open
- ☐ semi-open

***19. What kinds of information do you expect to get before and/or after staging? (may select more than one)**

- ☐ map/distance
- ☐ GPS coordinates
- ☐ weather conditions
- ☐ user recommendations
- ☐ universal design facilities

Other (please specify)

UserSurvey_Backpacker

20. Do you have any additional comments, questions, or suggestions?

21. Would you be willing to provide future input as we work through trail development?
Contact info:

UserSurvey_Paddler

Project Title
Bay-to-Bay Trail, Hiking and Backpacking Questionaire

Purpose
This questionnaire seeks your input for the planning and design of Bay to Bay Trail – a 35 mile hiking/paddling trail along Sleeping Bear Dunes National Lakeshore. We hope to better understand your paddling and camping preferences and your experience to help guide our design and management of water trail access, launch sites, and campground facilities.

Background Knowledge
The Bay to Bay Trail will provide visitors to Sleeping Bear Dunes with 35 miles of new backcountry hiking, camping, and paddling opportunities, traversing the length of the Park. It will provide hikers and paddlers better access to areas of the Park to enjoy wilderness and "backcountry" recreational experiences, connect the backcountry campgrounds, and identify new campgrounds which could also be used by kayakers. Working with stakeholder groups, the project team will also identify possible locations for adaptive kayak launches and campsites for mobility impaired visitors. The Bay to Bay water trail will be part of the Lake Michigan Water Trail, a four state effort to create a 1,640 mile contiguous water trail along the Lake Michigan shoreline.

Procedures
This survey contains 21 questions. The average time for completion of the survey is 15 minutes or less.

Participation
Participation is voluntary and if you have any questions about this questionnaire or the project, please feel free to contact Kerry, Han-Yu, or Shuting.

Contact Information
Kerry: kerryjkelly7@gmail.com
Han-Yu: alexhyc@umich.edu
Shuting: shutingw@umich.edu

UserSurvey_Paddler

***1. Which of the following best describe you?**

- ◯ year round resident
- ◯ vacation home resident
- ◯ visitor

Other (please specify)

***2. Where do you live in relation to Sleeping Bear Dunes?**

- ◯ Within 10 miles
- ◯ Within 30 miles (includes Traverse City Area)
- ◯ Within 100 miles
- ◯ Within Michigan
- ◯ Wisconsin
- ◯ Indiana
- ◯ Ohio
- ◯ Illinois

Other (please specify)

3. What kind of paddler would you consider yourself?

- ☐ kayaker
- ☐ canoer
- ☐ stand-up-paddler

Other (please specify)

4. What level paddler would you consider yourself?

- ◯ Beginner
- ◯ Novice
- ◯ Intermediate
- ◯ Advanced
- ◯ Expert

UserSurvey_Paddler

***5. How often do you paddle in a year?**

- ◯ 1~3 times
- ◯ 4~6 times
- ◯ 7~9 times
- ◯ 10~12 times
- ◯ over 12 times

If it is over 12, how many times a season?

***6. Would you see yourself using the trail (hiking or water) if it were to be built?**

- ◯ yes
- ◯ no
- ◯ maybe

***7. What type of paddling trip would you imagine taking on the Lake Michigan Bay to Bay Water Trail?**

- ☐ multi-day trip on Lake Michigan spanning length of National Lakeshore
- ☐ day trip on Lake Michigan for section of National Lakeshore
- ☐ multi-day trip on Lake Michigan for section of National Lakeshore
- ☐ multi-day trip on Lake Michigan which extends beyond the boundaries of the National Lakeshore

Other (please specify)

***8. Can you envision being part of a group where part of the group paddles and part of the group hikes?**

- ◯ yes
- ◯ no (if no, please skip #9)
- ◯ maybe

Other (please specify)

UserSurvey_Paddler

9. What type of trip would you imagine taking on the trail?

- ◯ multi-day trip on Lake Michigan spanning length of National Lakeshore
- ◯ day trip on Lake Michigan for section of National Lakeshore
- ◯ multi-day trip on Lake Michigan for section of National Lakeshore

Other (please specify)

***10. Boat Access Type: Would you launch your boat at: (may select more than one)**

- ☐ launch site with boat ramp or dock, parking available
- ☐ launch site with short carry, parking available
- ☐ launch site with long carry, parking available
- ☐ launch site with short carry, distant parking available
- ☐ launch site with short carry, limited parking available
- ☐ road end with no parking

Other (please specify)

***11. How many hours would you expect to paddle per day?**

- ◯ 0 ~ 2 hours
- ◯ 2 ~ 4 hours
- ◯ 4 ~ 6 hours
- ◯ 6 ~ 8 hours
- ◯ over 8 hours

UserSurvey_Paddler

***12. If you are planning a multi-day trip on the Bay to Bay water trail and are figuring out where you would like to stay overnight. How would you like to ensure a campground site?**

- ◯ Book and reserve a campground at one of the existing reservation points in National Lakeshore
- ◯ Book and reserve a campground online accessible from a mobile device
- ◯ No Reservation (camp in available space)

Other (please specify)

UserSurvey_Paddler

***13. Imagine you are paddling along the lakeshore and it's beginning to get dark. You and your fellow paddlers would like to get to shore and setup camp for the night. You've made reservations ahead of time and are looking for the campsite. What type(s) of signage, markers would you like to see to help indicate where to go to shore? Please be as specific as possible, including characteristics such as colors, heights, and size when possible. (Examples may include buoys, buoys with lights, signage on shore (i.e. road sign type facing water), light on shore, other landmarks)**

UserSurvey_Paddler

***14. On a scale of 1 to 5 (1 being least important to 5 being essential), please rank your preference for the following launch site amenities.**

	Least Important				Most Important
ADA accessible	◯	◯	◯	◯	◯
Boat Storage (e.g. racks)	◯	◯	◯	◯	◯
Camping	◯	◯	◯	◯	◯
Lighting	◯	◯	◯	◯	◯
Space to turn a vehicle around	◯	◯	◯	◯	◯
Parking	◯	◯	◯	◯	◯
Picnic Area	◯	◯	◯	◯	◯
Power	◯	◯	◯	◯	◯
Restrooms	◯	◯	◯	◯	◯
Shelter (not overnight use)	◯	◯	◯	◯	◯
Potable Water	◯	◯	◯	◯	◯
WiFi	◯	◯	◯	◯	◯
Good cell phone reception (at least 3 bars)	◯	◯	◯	◯	◯

UserSurvey_Paddler

***15. On a scale of 1 to 5 (1 being not desirable to 5 being most desirable), please rank your preference for the following campground amenities along the water trail.**

	Prefer not to be present				Prefer to be present
Vault toilets	◯	◯	◯	◯	◯
Potable water	◯	◯	◯	◯	◯
Food/pack locker	◯	◯	◯	◯	◯
Boat rack	◯	◯	◯	◯	◯
Solar cell phone charging station	◯	◯	◯	◯	◯
Canopy shelter	◯	◯	◯	◯	◯
Access to parking	◯	◯	◯	◯	◯
Interpretive signs	◯	◯	◯	◯	◯
Fire pit	◯	◯	◯	◯	◯
Directional maps, signs	◯	◯	◯	◯	◯
Pack in/ Pack out garbage regulations	◯	◯	◯	◯	◯
Garbage & recycling receptacles nearby	◯	◯	◯	◯	◯
Good exposure to south/sun	◯	◯	◯	◯	◯
Flat surface to set up camp	◯	◯	◯	◯	◯
Privacy	◯	◯	◯	◯	◯
Solitude	◯	◯	◯	◯	◯

UserSurvey_Paddler

16. How important is a remote campsite to your camping experience?

I would prefer a remote campsite, wildness experience. The farther from the road the better.				I would like to be close to the road for access.
◯	◯	◯	◯	◯

17. How important is proximity of the campsite to the lake?

Not very important. I would be fine with hiking in a ways and carrying my boat.	2	3	4	Very important. I would like the campsite to be as close to the water.
◯	◯	◯	◯	◯

18. What type(s) of campsites would you prefer? (may select more than one)

- ☐ beach camping
- ☐ platform camping
- ☐ backcountry woods
- ☐ sunny/open
- ☐ semi-open

*19. What kind of information do you expect to get from park service before/after staging? (may select more than one)

- ☐ map/distance
- ☐ GPS coordinates
- ☐ weather conditions
- ☐ marine forecast
- ☐ user recommendations
- ☐ universal design facilities

Other (please specify)

UserSurvey_Paddler

20. Do you have any additional comments, questions, or suggestions?

21. Would you be willing to provide future input as we work through trail development?

Contact info:

B. Experience Level Definitions and Survey Results

Backpacker and Paddler Experience Level Definitions

Backpacker

- Beginner – Recently bought gear and has backpacked 0-3 times in the past 3 years. Has only backpacked with others who are knowledgeable and in places of on trails that are well marked. Backpacking trips last just a few days at the most.

- Intermediate – Has backpacked at least 4 times and is experienced with gear. Has done at least one long (30+ miles) backpacking trip including at least 4 nights in 4 different campsites.

- Advanced – Has taken many backpacking trips over more than 5 years including long trips with multiple camping experiences. Has been the lead backpacker on group trips and has backpacked in wilderness and possibly unmarked areas.

- Expert – Has taken many multi-day backpacking trips over the past 10 years or more. Has led backpacking groups into wilderness and unmarked areas. Teaches others backpacking and leads backpacking groups. Is recognized by the backpacking community as an expert.

Paddler

- Beginner – Just bought a boat or is borrowing or renting. Has only the minimum safety and kayaking equipment. Has only done short touring kayaking on a large body of water (Great Lake or ocean) 0-3 times. Has little or no experience kayaking in large waves.

- Intermediate – Has own boat. Owns and is familiar with safety and camping equipment. Has been on multi-day kayak/camping trips and has some experience with kayaking on large bodies of water. Knows emergency procedures, how to get upright if tipped, and how to use a compass, maps, and GPS.

- Advanced – Owns and is familiar with a boat as well as safety and camping equipment. Has led multi-day kayak/camping trips and has a lot of experience with kayaking on large bodies of water (>10 times). Can perform an Eskimo roll under most conditions. Has helped others do wet recoveries after tipping over and coming out of their boats. Knows wilderness survival techniques as well as how to use a compass, map, and GPS.

- Expert - Same as Advanced (above) and, in addition, is familiar with a variety of boats, paddles, safety equipment and backpacking equipment used for overnight camping from the kayak. Teaches kayaking and survival skills. Leads touring kayaking trips on multi-day trips. Has done open water crossings and has experience paddling in high waves and wind.

Descriptive and Statistical Analysis of User Group Survey Results – Hiking/Backpacking

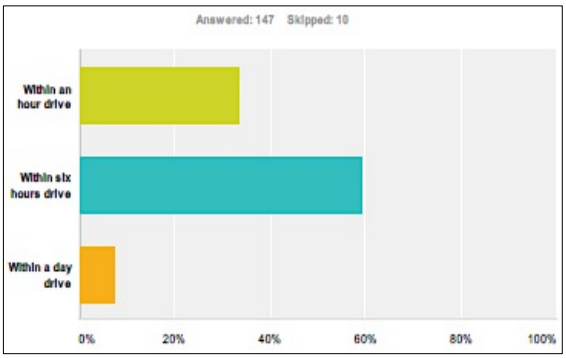


Figure. 1. Where do you live in relation to Sleeping Bear Dunes?

A large segment of the respondents live either within an hour drive or within six hours drive of Sleeping Bear Dunes. Only a small proportion of the hiker/backpackers drive for a day or more to get to the area.

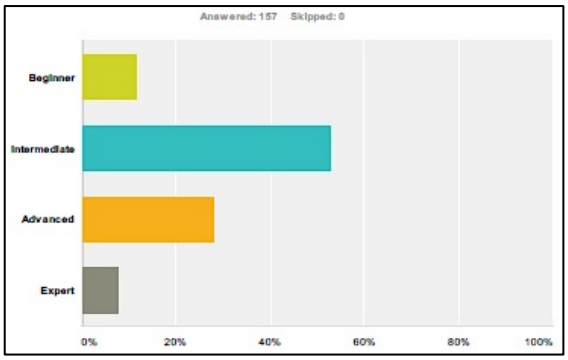


Figure. 2. How experienced of a backpacker are you?

A majority of the respondents were either intermediate or advanced hikers/backpackers. The smallest proportion of the survey takers was expert hikers/backpackers.

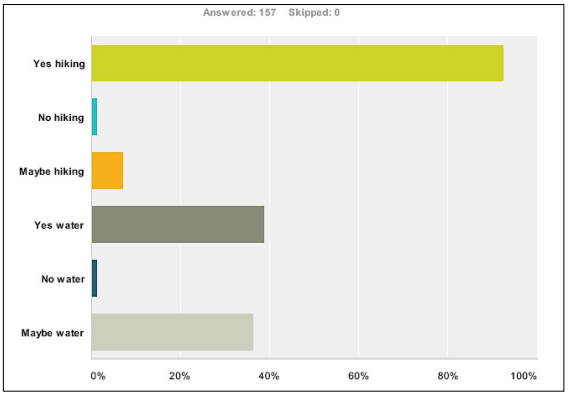


Figure. 3. Do you see yourself using the trail (hiking or water) if it were to be built as proposed?

Most backpackers saw themselves using the hiking trail if it were to be built, while about only 40% of them showed a strong preference for using the water trail.

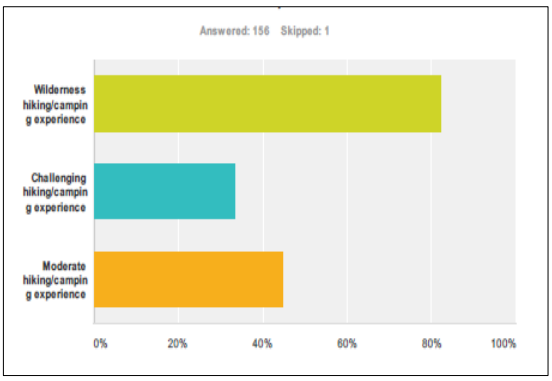


Figure. 4. What experience would you be hoping for when hiking?

Out of 156 respondents, a large proportion of hikers were interested in a wilderness hiking/camping experience. A challenging hiking/camping experience was the least preferable type of experience for all the level of hikers. The second preference was a moderate hiking/camping experience.

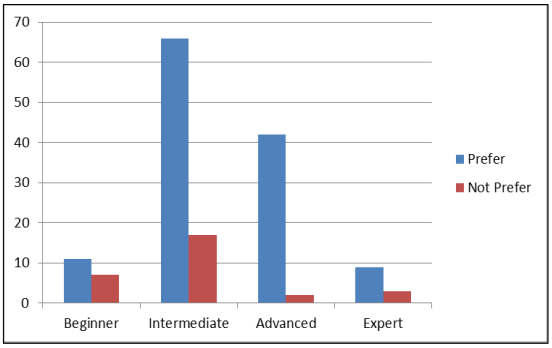


Figure. 5. Preferences of each level backpackers in wilderness hiking/camping experience.

(p-value = 0.01064)

As expected, a large majority of intermediate, advanced and expert backpackers indicated a preference for a wilderness hiking/camping experience. Only a small proportion of these types of backpackers said they do not prefer a wilderness hiking/camping experience. There is a small difference between the proportion of beginner hikers who prefer a wilderness experience and those who did not prefer it.

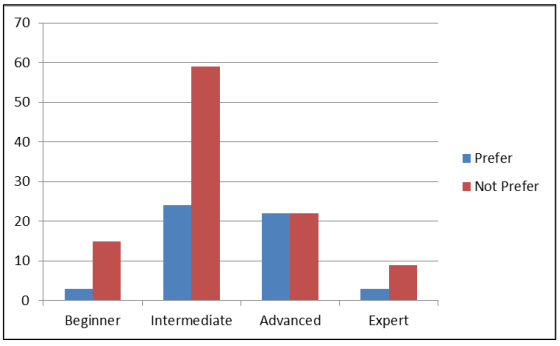


Figure. 6. Preferences of each level backpackers in challenging hiking/camping experience.

(p-value = 0.01426)

Most of respondents did not prefer a challenging hiking/camping experience. A large majority of beginner, intermediate and expert hikers said they do not prefer challenging hiking/camping experience; while an equal proportion of advanced hikers had an inclination for or against a challenging experience.

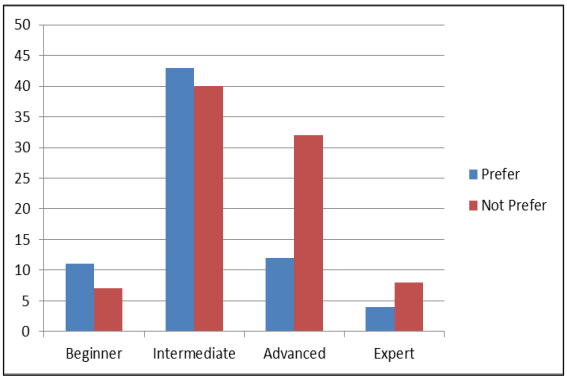


Figure. 7. Preferences of each level backpackers in moderate hiking/camping experience.

(p-value = 0.02135)

Most of advanced and expert hikers were more inclined to not prefer a moderate hiking experience whereas beginner backpackers and intermediate hikers were divided in their preferences.

Answered: 154 Skipped: 3

	1	2	3	4	Total	Average Ranking
Scenic views	59.09% 91	25.97% 40	8.44% 13	6.49% 10	154	3.38
Challenging adventure	18.18% 28	19.48% 30	16.88% 26	45.45% 70	154	2.10
Wildlife viewing	7.14% 11	17.53% 27	43.51% 67	31.82% 49	154	2.00
Diversity of landscape	15.58% 24	37.01% 57	31.17% 48	16.23% 25	154	2.52

Table. 1. Rank importance of the following relative to each other in your hiking experience. (1 = most important, 4 = least important)

Based on the backpackers' rankings, scenic views were the most important hiking experience among scenic views, challenging adventure, wildlife viewing, and diversity of landscape.

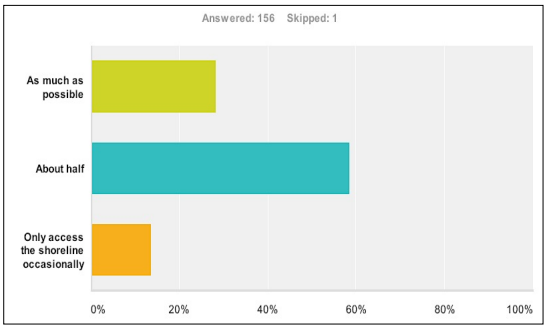


Figure. 8. How much of the hiking trail should follow close to the Lake Michigan shoreline, versus through other areas of the Park?

Most backpackers preferred about half of the hiking trail to follow close to the Lake Michigan shoreline. Also, many backpackers selected as much hiking trail following close to the Lake Michigan shoreline as possible, while few backpackers showed preference in only access the shoreline occasionally.

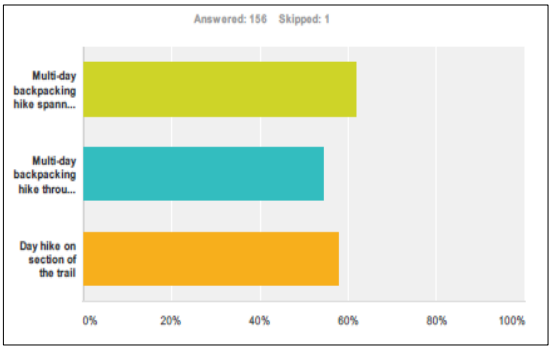


Figure. 9. What type of hiking trip would you imagine taking on the trail?

The responses from the survey indicate that most of the backpackers had an equal preference for a multi-day trip spanning the entire National Lakeshore, a multi-day trip through part of the National Lakeshore or a single day trip on a section of trial network.

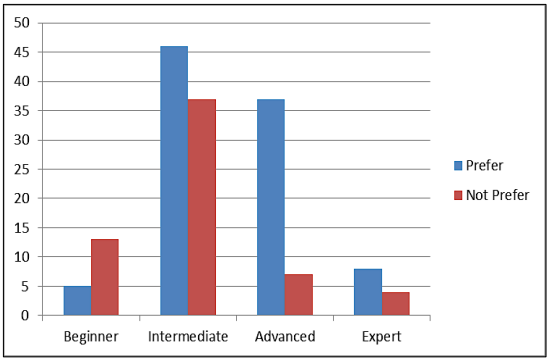


Figure. 10. Preferences of each level backpackers in multi-day backpacking hike spanning entire the National Lakeshore.

(p-value = 0.000217)

Further analysis of the different groups showed that a higher proportion of advanced backpackers have a preference for a multi-day trip spanning the entire Lakeshore. The beginner backpacker responses indicated a higher non-preference for such a trip, while the reverse was applicable for expert backpackers. Intermediate backpackers were almost evenly decided about their preference.

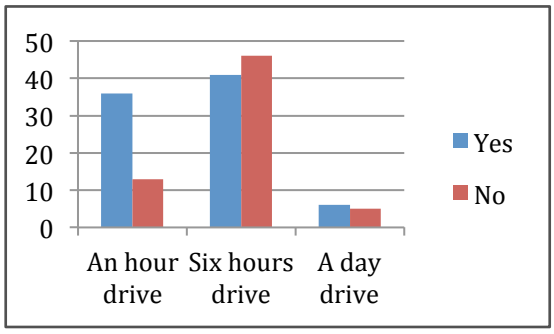


Figure. 11. Preferences of each group backpackers based on the distances from their houses to Sleeping Bear Dunes in day hike on section of the trail. (p-value = 0.01188)

Further analysis of the different groups grouped by distance from their homes to Sleeping Bear Dunes shows that most local backpackers within an hour drive are willing to do a day hike on a section of the trail, while those living farther away did not present an obvious trend in their responses.

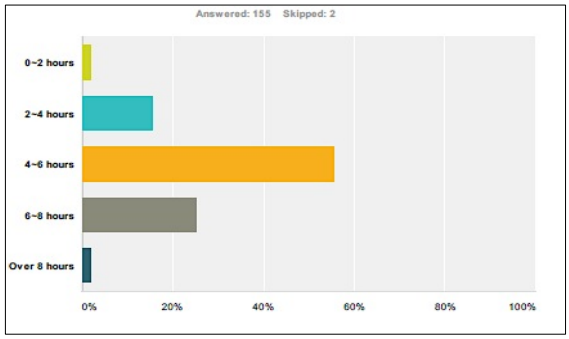


Figure. 12. How many hours would you expect to hike per day?

A significant number of backpackers indicated a preference for a hike spanning 4-6 hours. The next preference was for 6-8 hours followed by a third preference of 2-4 hours. A much lower number of responses showed a preference for a trip of 0-2 hours or one of over 8 hours.

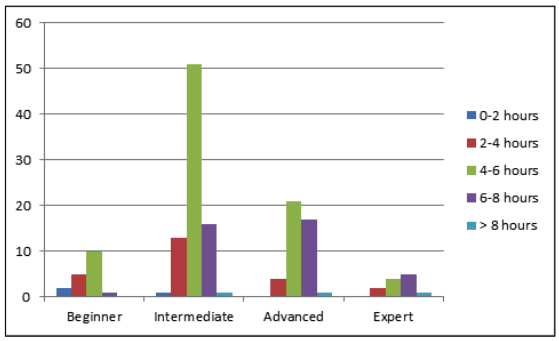


Figure. 13. The preferred time for hiking per day of each level backpackers. (p-value = 0.03262)

Beginner and especially intermediate back-packers showed a preference for a 4-6 hour trip. The preference for the length of a trip increased as the expertise of the backpacker increased. This is reflected in the response by advanced and expert back-packers showing a much larger interest in a 6-8 hour trip. Results of the survey also highlighted the lack of interest in either a 0-2 hour or a more than 8 hour trip.

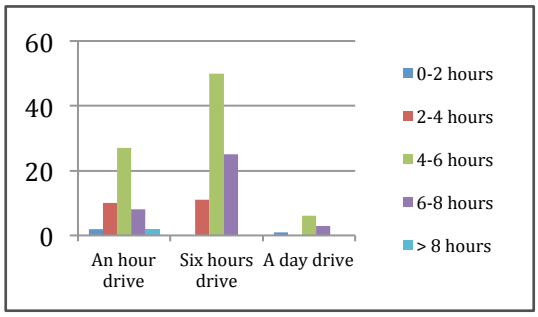


Figure. 14. The preferred time for hiking per day of each group backpackers based on the distances from their houses to Sleeping Bear Dunes. (p-value = 0.06471)

When the respondents are broken up by their travel time to Sleeping Bear Dunes, the most preferable hiking time per day in each group was still 4-6 hours. However, the backpackers who live farther from Sleeping Bear Dunes preferred 6-8 hours as their second choice, while local backpackers within an hour drive had an almost even preference in 2-4 hours and 6-8 hours. That is, local backpackers generally preferred 2-8 hours hiking per day, while the other backpackers preferred 4-8 hours hiking per day.

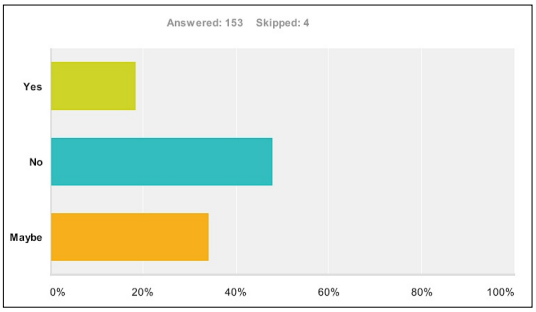


Figure. 15. Do you envision yourself being part of a group where some members paddle and others hike?

The result showed that only a small proportion of backpackers envisioned themselves being part of a group where some members paddle and others hike.

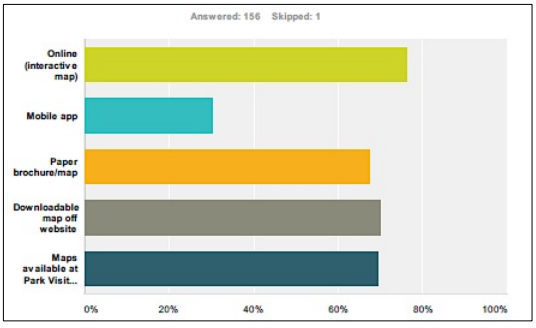


Figure. 16. For trip planning purposes, how would you like to view information about the trail?

Respondents to the survey showed a preference to view information about the trails by going online, through a paper brochure, by downloading a map off the website, and through maps available at the Park Visitors Center. There was little preference for information dissemination through a mobile app.

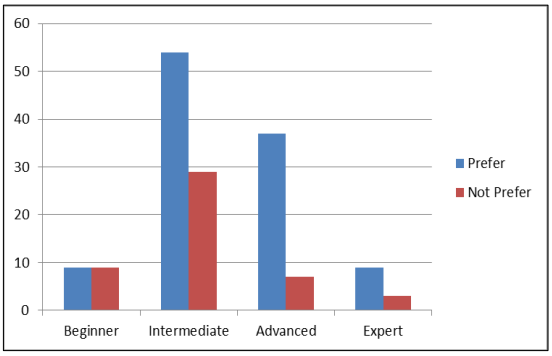


Figure. 17. Preferences of each level backpackers in downloadable map off website. (p-value = 0.03544)

Beginner back-packers appear to be divided in their preference for downloading maps from the website. Intermediate, advanced and expert backpackers show a greater affinity to getting their information via a map off the website. The presence of a large enough proportion of respondents that indicate their non-preference to getting their maps from the website could mean that other ways of disseminating information about the trail is needed.

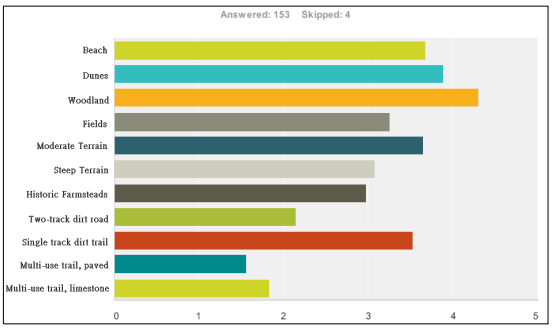


Figure. 18. Preference for the following land covers and trail types for the Bay to Bay hiking trail. (1 being not important to 5 being essential)

Results of the survey showed that woodland, dunes, and beach were the top three preferred landcover types, while preferences were relatively low for steep terrain and historic farmsteads. On the other hand, single-track dirt trails were most preferable, while multi-use trails of either pavement or limestone was not preferred. In further analysis, different level backpackers had diverse opinions only for multi-use trails.

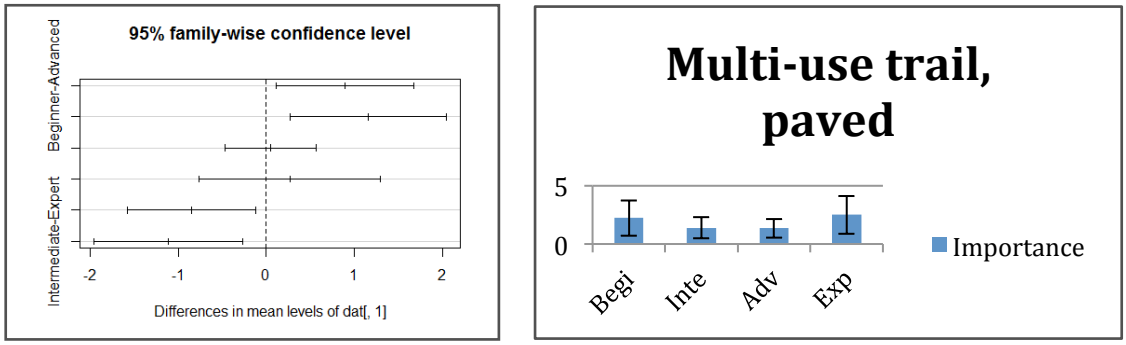


Figure. 18. Differences of preferences in multi-use trail, paved between each level backpackers. (p-value = 0.0002343)

According to the graphs, advanced and intermediate backpackers generally had less preference for paved multi-use trails than the other two groups of backpackers. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

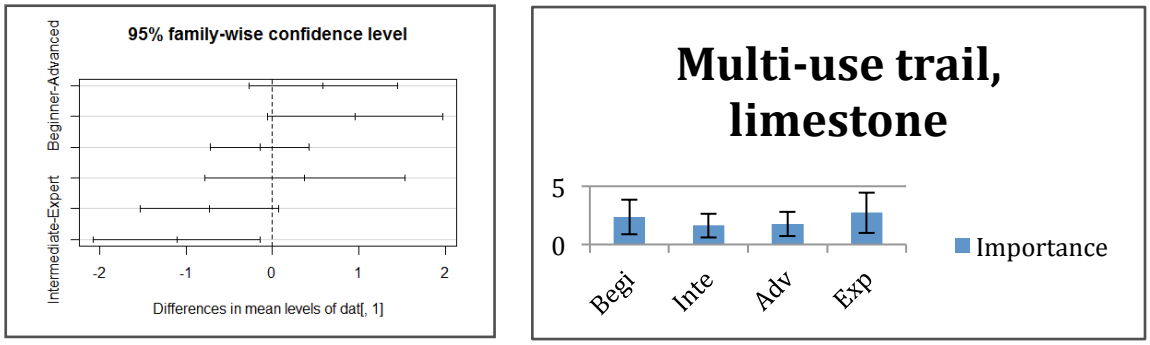


Figure. 19. Differences of preferences in multi-use trail, limestone between each level backpackers. (p-value = 0.00617)

Based on the graphs, intermediate backpackers had less preference in limestone multi-use trails than expert backpackers. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

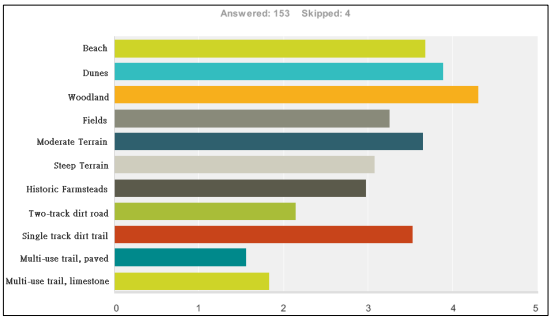
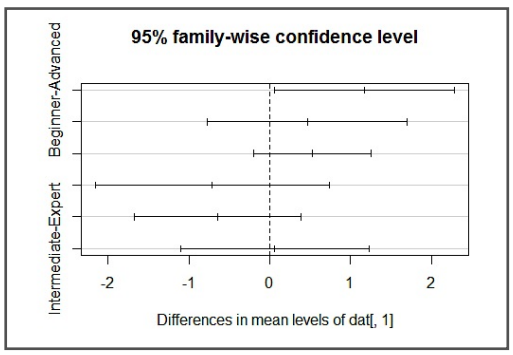


Figure. 20. Preference for the following back country campground amenities along the hiking trail. (1 being not important to 5 being essential)

Results of the survey indicated that the top three preferences for back country campground amenities along the hiking trail were solitude, pack in /pack out garbage regulations, and directional maps/signs. The next set of preferences, and not necessarily showing any strong preference, were a presence of tree canopy, potable water, vault toilet, fire pit and access to overnight parking. Furthermore, different level backpackers had diverse preferences in access to overnight parking and garbage & recycling receptacles nearby.



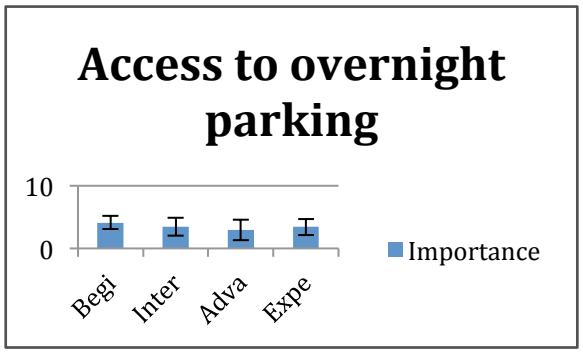


Figure. 21. Differences of preferences for campground amenities in access to overnight parking between each level backpackers. (p-value = 0.04726)

According to the survey findings, advanced backpackers generally believed that access to overnight parking was relatively less important than what beginner backpackers thought. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

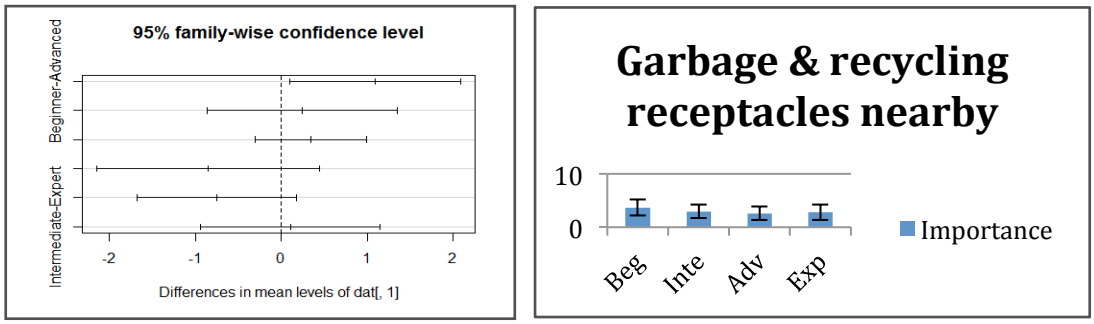


Figure. 22. Differences of preferences for campground amenities in garbage & recycling receptacles nearby between each level backpackers.
(p-value = 0.0452)

Advanced backpackers generally believed that garbage & recycling receptacles nearby was relatively less important than what beginner backpackers thought. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

Answered: 148 Skipped: 9

	I would like to be close to roads for ease of access.	(no label)	Neutral	(no label)	I would prefer a remote,wilderness experience. The farther from the road the better.	Total	Average Rating
(no label)	1.35% 2	2.70% 4	8.78% 13	20.27% 30	66.89% 99	148	4.49

Table. 2. Important of remote campsite to camping experience for backpackers.

For the camping experience, there was a tendency that backpackers preferred a remote, wilderness experience based on the survey result. That is, backpackers would like a remote campsite far from roads.

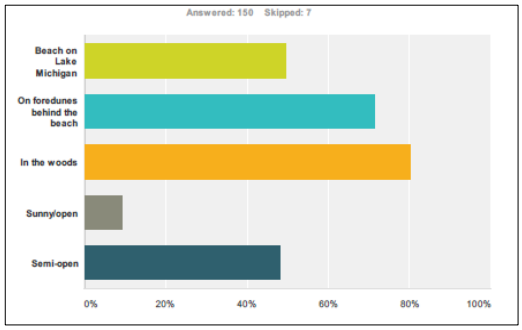


Figure. 23. What type(s) of campsites would you prefer?

Backpackers showed a strong preference for a campsite either in the woods or on the foredunes behind the beach. Their next two choices were for a campsite either on the beach on Lake Michigan or at a site which is semi-open.

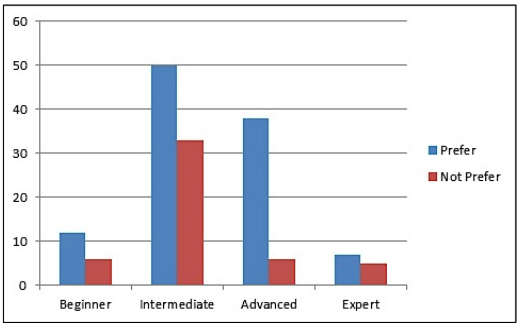


Figure. 24. Preferences of each level backpackers for campsites on foredunes behind the beach. (p-value = 0.02161)

Survey responses indicated that most backpackers had a preference for a campsite set in the foredunes behind the beach. A high proportion of advanced backpackers had a marked preference for this kind of location as a campsite. A sizable response by other categories of backpackers for a non-preference indicated that not everyone is in agreement on the site location behind the beach.

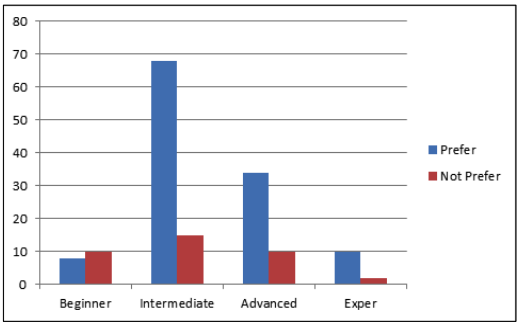


Figure. 25. Preferences of each level backpackers for campsites in the woods. (p-value = 0.007922)

A high proportion of intermediate, advanced and expert backpackers indicated a strong preference for a campsite located in the woods. Beginner backpackers were more evenly divided in their preference, with a higher non-preference for it.

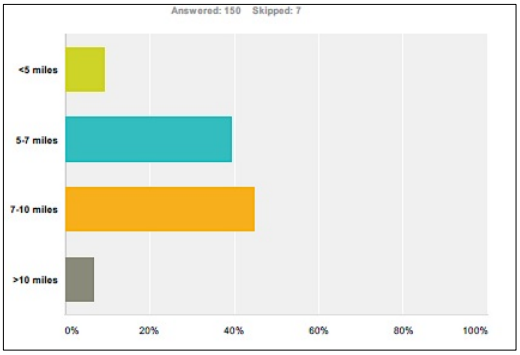


Figure. 26. How far do you want to hike between campgrounds? (<5 miles; 5-7 miles; 7-10 miles; >10 miles)

Survey responses indicate that a large proportion of backpackers have a preference for either a 5-7 mile or a 7-10 mile hike when travelling between campgrounds. Between the two options, a 7-10 mile hike was slightly more preferred. The 10-mile hike between the campgrounds was the least preferred among the backpackers.

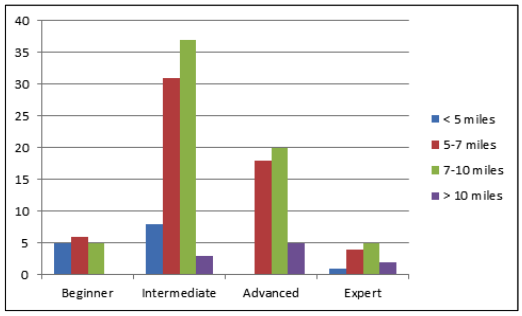


Figure. 27. The preferred distance between campgrounds of each level backpackers. (p-value = 0.02766)

Beginner backpackers were evenly divided in their preferences regarding the length of a hike between campgrounds. They showed the least amount of interest among the backpackers in a hike greater than 10 miles between the campgrounds. Intermediate backpackers showed approximately the same amount of interest in a 5-7 mile and 7-10 mile hike between campgrounds, with a few respondents willing to opt for a more hike over 10 miles. Advanced backpackers preferred a hike more than 5 miles, with similar preference for 5-7 mile and 7-10 mile hikes between campgrounds. The expert backpackers responses indicate that they also have a stronger preference for a hike between campgrounds of more than 5 miles. They, in fact, had a higher preference for a hike over 10 miles as compared to a hike less than 5 miles between campgrounds.

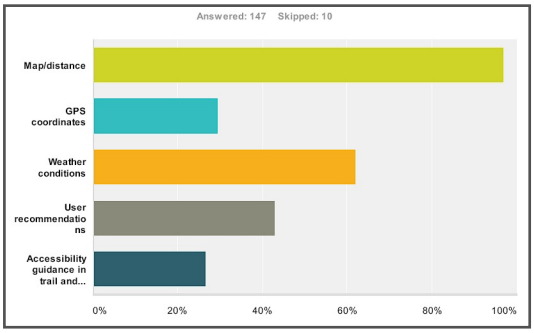


Figure. 28. What kinds of information do you expect to get before and/or after staging?

The results show that backpackers would like a map with distances as a tool for information before or during the trip and had a strong preference for knowing the weather conditions. Few backpackers expected to get GPS coordinates and accessibility guidance on trail and campground facilities before or during the trip.

Descriptive and Statistical Analysis of Bay to Bay Survey Results – Paddlers

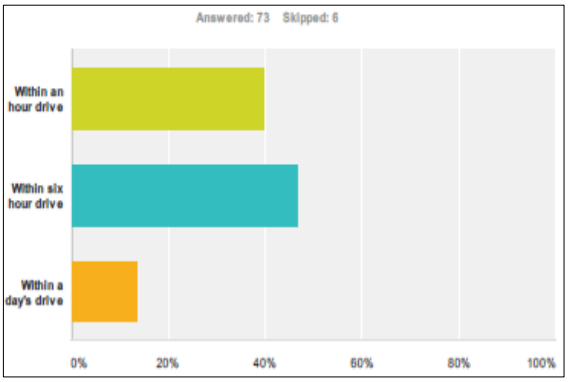


Figure. 29. Where do you live in relation to Sleeping Bear Dunes?

A majority of the respondents to the survey lived either within an hour's drive or within six hours drive from Sleeping Bear Dunes. A smaller proportion lived a day's drive away.

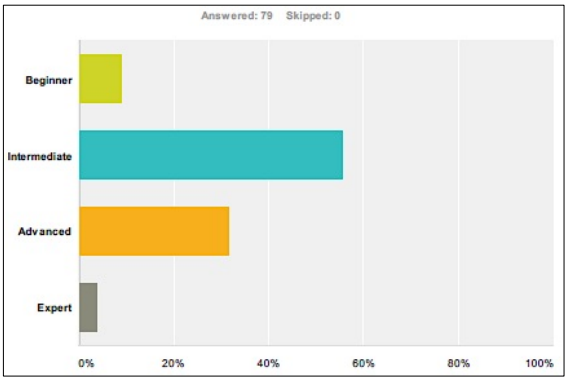


Figure. 30. How experienced of a paddler are you?

Among the survey takers the majority of paddlers were intermediate paddlers followed by advanced paddlers. The expert paddlers were the smallest group among the respondents.

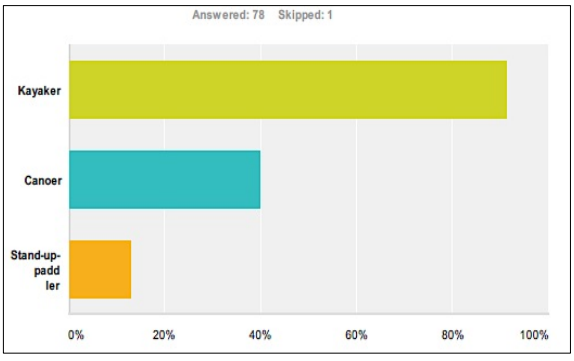


Figure. 31. What kind of paddler are you?

The paddler survey results indicate that a majority of the paddlers are either kayakers or canoers. A proportionately larger segment of the respondents had a preference for kayaking. A few survey takers also indicated a desire for stand-up paddling.

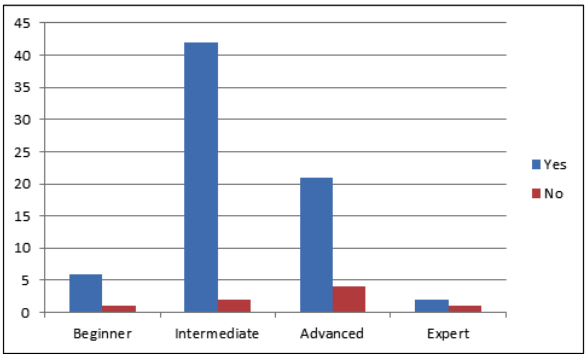


Figure. 32. Kayakers of each level paddlers. (p-value = 0.225)
A large proportion of paddler respondents were beginner, intermediate and advanced kayakers. Expert paddlers were few in number.

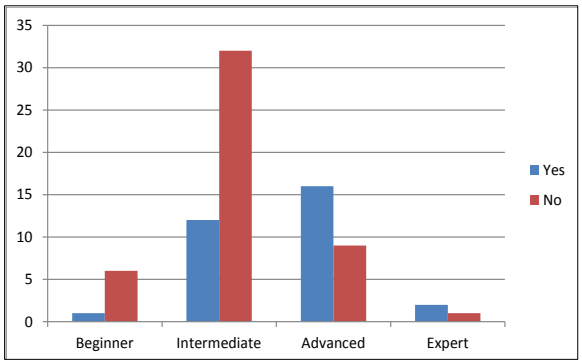


Figure. 33. Canoers of each level paddlers. (p-value = 0.00793)
Among the respondents, a larger number of canoers were either intermediate or advanced. A much smaller proportion consists of either beginner or expert canoers.

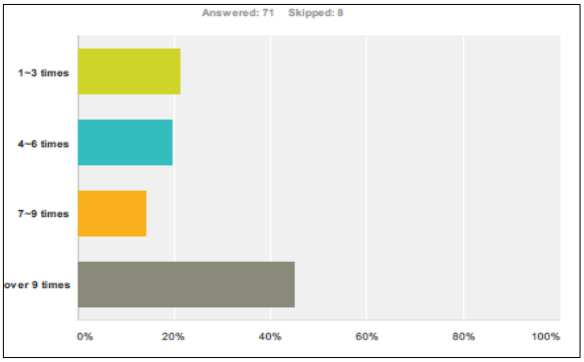


Figure. 34. How often do you paddle in a year?
The results of the paddler survey show that most of the kayakers, canoers and stand-up paddlers paddled at least once every year. The highest proportion of paddlers paddled over 9 times a year followed by a mix of respondents varying in their paddling activities from 1-9 times a year.

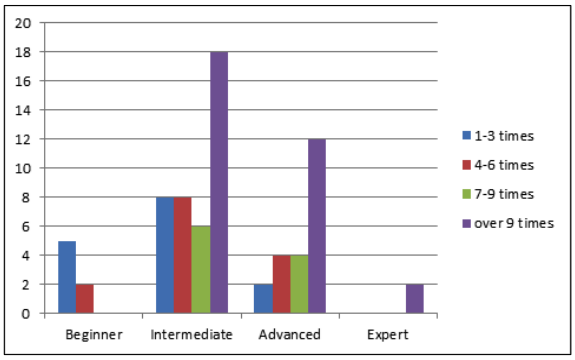


Figure. 35. Paddling times per year of each level backpackers.

A further analysis of the results shows that beginner paddlers had a preference first for paddling 1-3 times a year and then a slightly lower preference for paddling 4-6 times a year. Intermediate and advanced paddlers had a marked preference for paddling over 9 times a year. Expert paddlers indicated a strong liking for paddling over 9 times a year. (p-value = 0.0411)

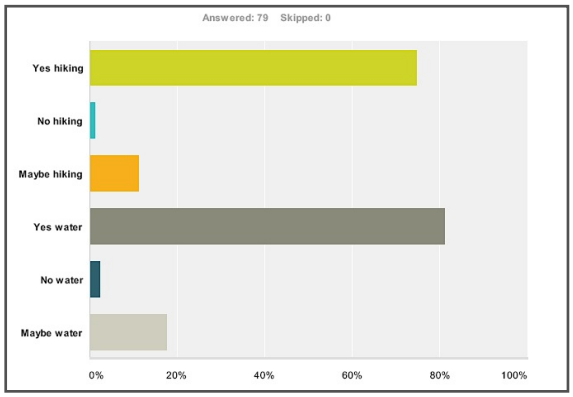


Figure. 36. Would you see yourself using the trail if it were to be built?

Most paddlers saw themselves using both the hiking trail and the water trail.

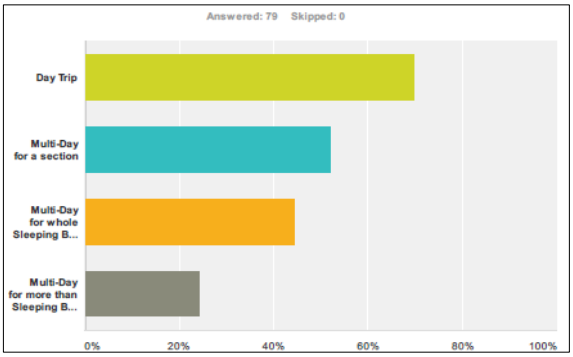


Figure. 37. What type of paddling trip would you imagine taking on the Bay to Bay Water Trail?

A majority of respondents to the survey indicated an equal preference for a trip ranging from a day trip to a multi-day trip along either a section of the Sleeping Bear Dunes lakeshore or along the entirety of the Lakeshore. Interestingly a few survey takers also showed a preference for a multi-day trip coupled with a trip to Sleeping Bear Dunes indicating a possible desire for a more varied experience.

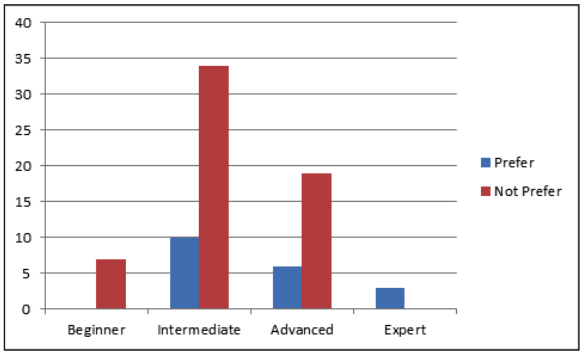


Figure. 38. Preferences of each level paddlers for paddling in multi-Day for more than Sleeping Bear Dunes. (p-value = 0.008358)
Within the smaller segment, expert paddlers, with a smaller proportion of intermediate and advanced paddlers, showed a preference for a multi-day trip for more than the Sleeping Bear Dunes lakeshore. Beginner paddlers did not show any inclination for a multi-day trip for more than the Sleeping Bear Dunes lakeshore.

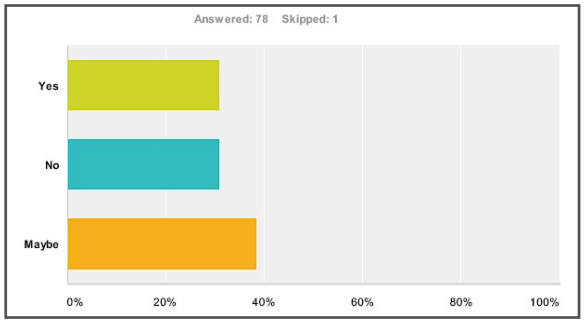


Figure. 39. Do you envision yourself being part of a group where some members paddle and others hike?
The results show that about half the paddlers envision themselves being part of a group where some members paddle and others hike, while the other half do not.

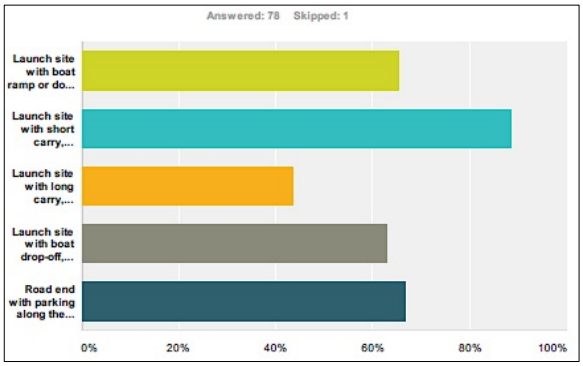


Figure. 40. Boat Access Type: Which option would you choose to launch your boat?
A launch site with a short carry option (distance of less than 100 feet) and available parking was the preferred choice for a large proportion of paddlers. The other choices (launch site with boat ramp or dock, parking available/launch site with boat drop-off, distant parking/road end with parking along the road) were evenly distributed as preferences for the paddlers. A launch site with a long carry and available parking was not as well liked by the paddlers as the rest of the choices.

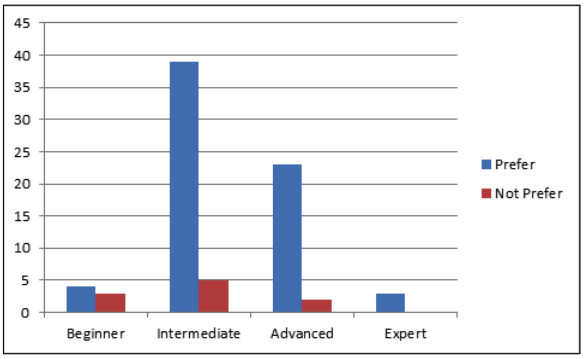


Figure. 41. Preferences of each level paddlers for boat access in A launch site with a short carry option (distance of less than 100 feet), with parking available.
(p-value = 0.07973)
All the categories of paddlers indicated their preference for a launch site with a short carry option (distance of less than 100 feet), with parking available. A visibly higher proportion of intermediate, advanced and expert paddlers marked their preference for such a launch site.

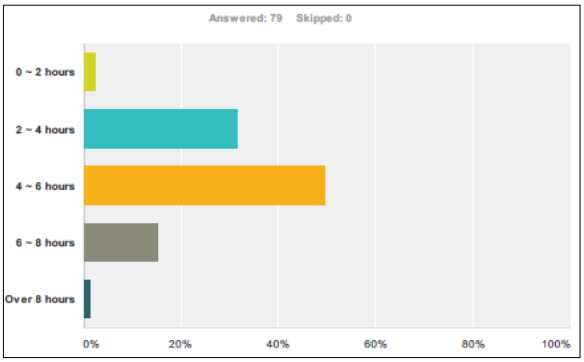


Figure. 42. How many hours would you expect to paddle per day?
A paddling trip of 4-6 hours, followed by a 2-4 hour trip were the main preferences for most of the paddlers. A few of the respondents showed a preference for a 6-8 hour paddle. There was little liking for either a 0-2 hour paddle or a trip over 8 hours.

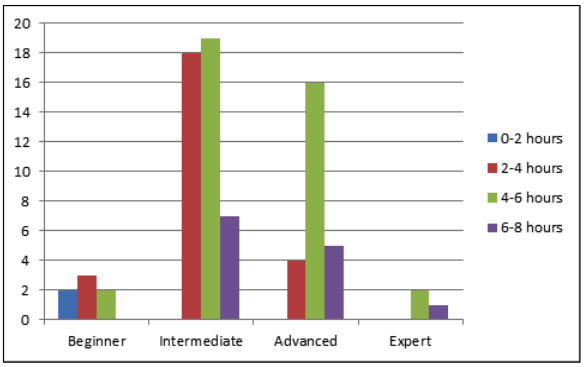


Figure. 43. The preferred time for paddling per day of each level paddlers.
Beginner paddlers were divided in their preference for trips ranging from 0-2, 2-4, 4-6 hours but did not have a preference for a 6-8 hour paddle. Intermediate paddlers showed a preference for 2-4 and 4-6 hour paddles. Advanced paddlers strongly preferred a 4-6 hour trip over others. Intermediate, advanced and expert paddlers also indicated an inclination toward a 6-8 hour trip. (p-value = 0.000644)

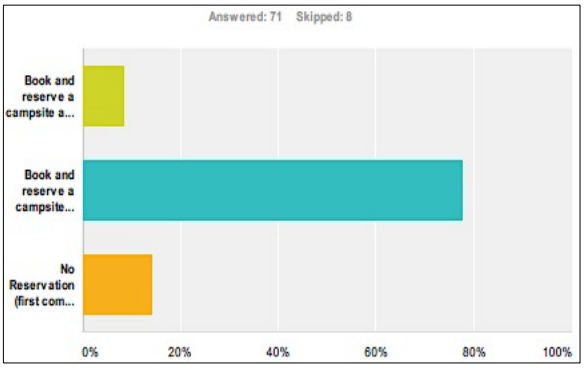


Figure. 44. If you are planning a multi-day trip on the Bay to Bay water trail, how would you like to ensure a campground site?

Survey respondents showed a marked preference for an online booking of a reservation for a campsite.

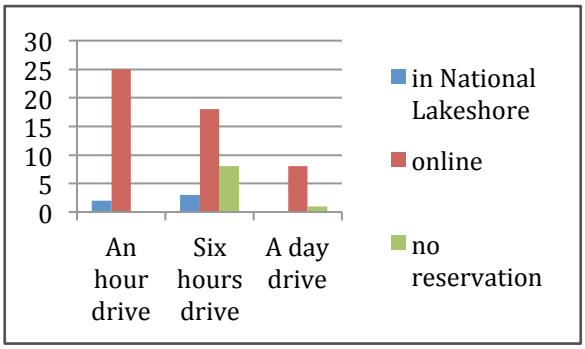


Figure. 45. For the paddlers who are planning a multi-day trip on the Bay to Bay water trail, the preferred way to reserve a campground site of each group based on the locations of their houses.

(p-value = 0.03271)

Based on the graph, most paddlers preferred to reserve campsites online. Specifically, no local paddlers within an hour drive showed preference in first come, first serve, while many other paddlers selected no reservation (first come, first serve). On the other hand, only few paddlers preferred to book and reserve a campsite at one of the existing reservation points in the Park.

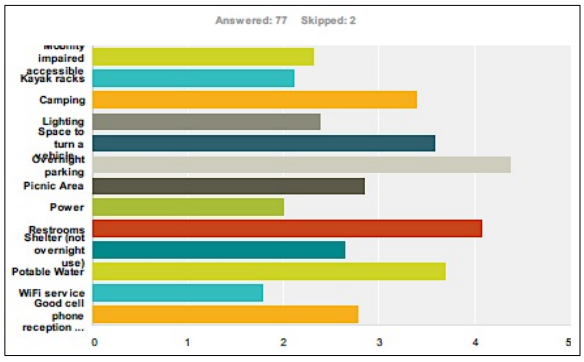


Figure. 46. Ranking preferences for launch site amenities

The survey results showed that the most preferred launch site amenity was overnight parking. The next most preferred amenity was restrooms. Potable water, space to turn a vehicle around and camping options were ranked lower and had the same level of preference. Wi-Fi service was the lowest ranked amenity.

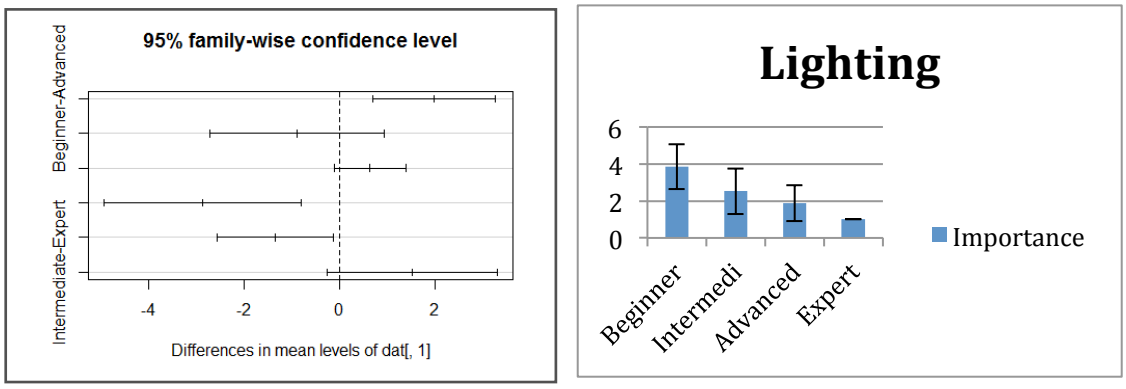


Figure. 47. Differences of preferences for launch site amenities in lighting between each level paddlers. (p-value = 0.0002453)

Based on the survey results, beginner paddlers generally thought that lighting was a more important amenity for a launch site than what other backpackers thought. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

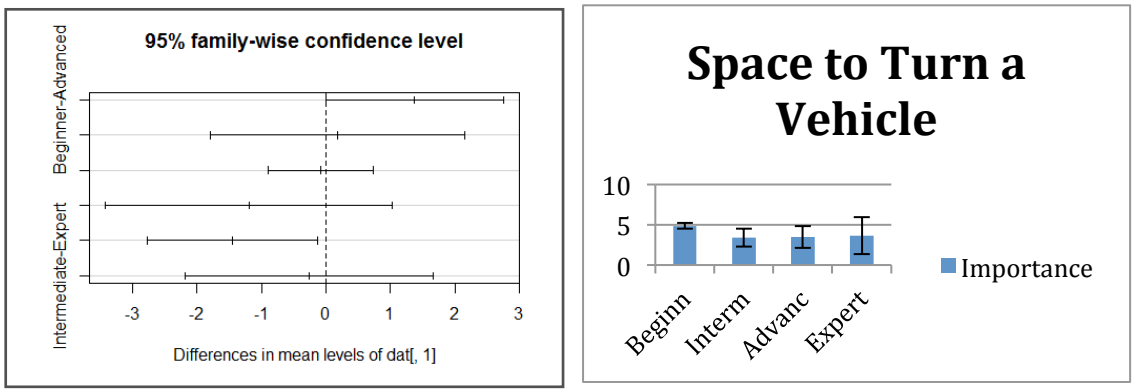


Figure. 48. Differences of preferences for launch site amenities in space to turn a vehicle between each level paddlers. (p-value = 0.04201)

Beginner paddlers show the most preference for space to turn a vehicle around. Advanced and intermediate paddlers show less preference than beginners for this amenity. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

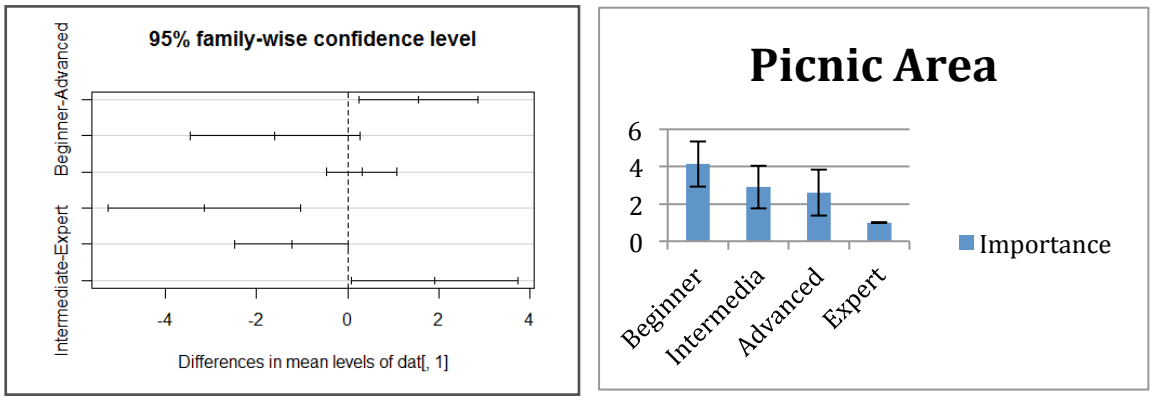


Figure. 49. Differences of preferences for launch site amenities in picnic area between each level paddlers. (p-value = 0.001235)

Among the respondents, beginner paddlers thought that a picnic area is an important amenity for a launch site, while expert paddlers do not prefer this amenity. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

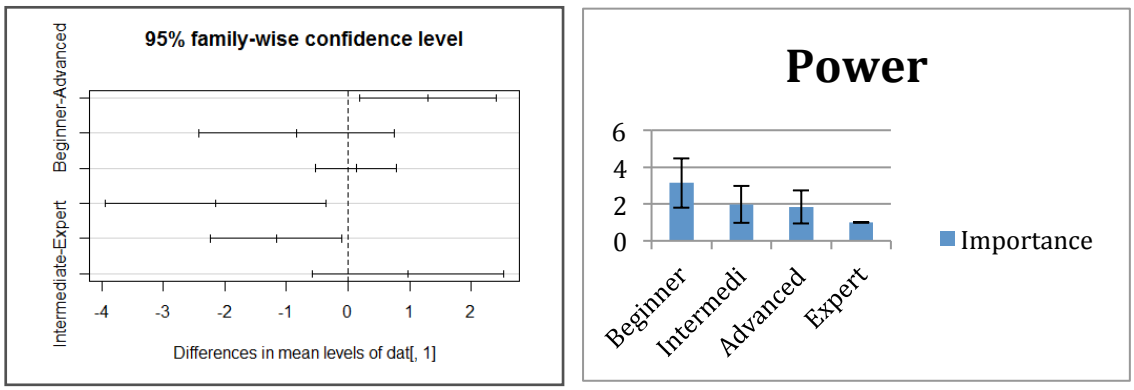


Figure. 50. Differences of preferences for launch site amenities in power between each level paddlers. (p-value = 0.006866)

According to the survey results, power as an amenity for a launch site is more crucial for beginner paddlers than for paddlers of other levels. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

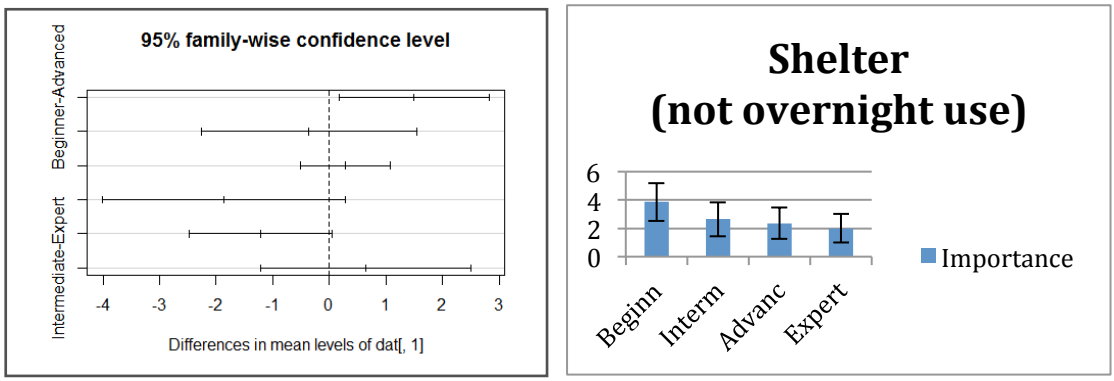


Figure. 51. Differences of preferences for launch site amenities in shelter (not overnight use) between each level paddlers. (p-value = 0.02736)
Based on the graphs, a shelter is more important for beginner paddlers than for expert paddlers. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

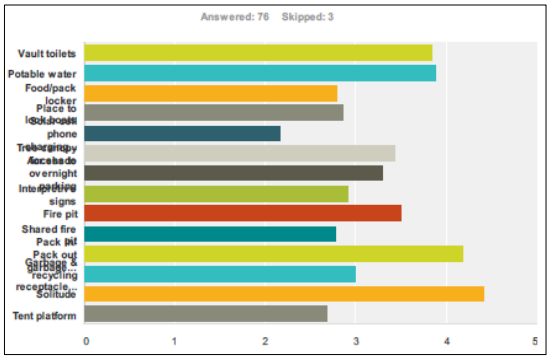


Figure. 52. Ranking of preference for campground amenities along the water trail
Paddlers ranked solitude as their top preference. This was closely followed by a preference for pack in/pack out garbage regulations. Potable water and vault toilets were grouped together in the next order of preference. Solar cell phone charging station was the least preferred of the amenities for the survey respondents.

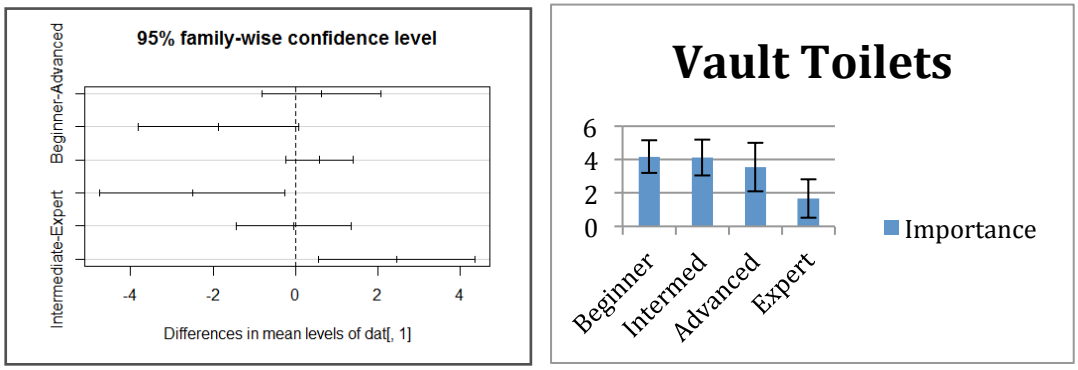


Figure. 53. Differences of preferences for campground amenities vault toilets between each level paddlers. (p-value = 0.005193)

Based on the survey results, a vault toilet as an amenity for campground is more important for beginner and intermediate paddlers than for expert paddlers. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

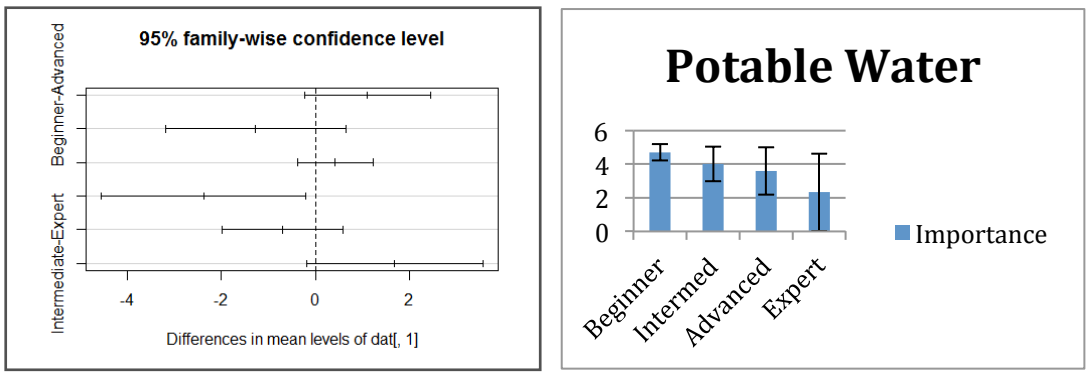


Figure. 54. Differences of preferences for campground amenities potable water between each level paddlers. (p-value = 0.02067)

We found differences between beginner and expert paddlers in their preference for potable water as a campground amenity. Beginner paddlers regarded potable water as a more crucial amenity than that expert paddlers. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

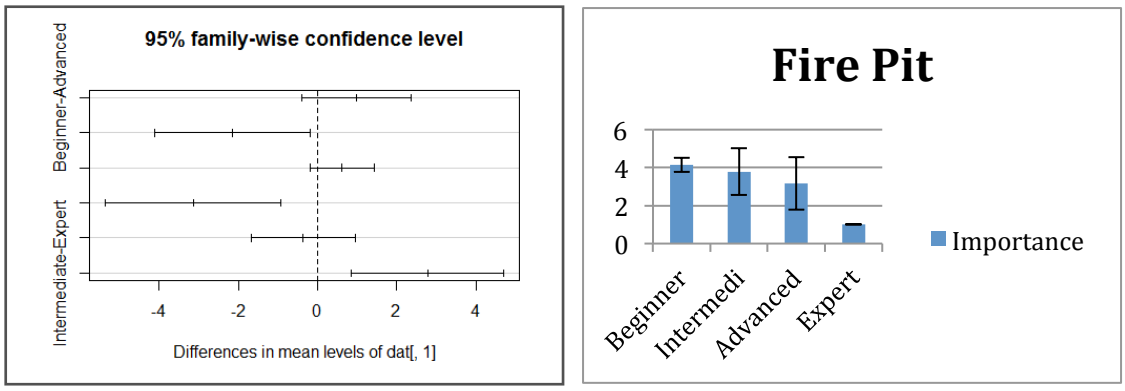


Figure. 55. Differences of preferences for campground amenities fire pit between each level paddlers. (p-value = 0.00082)

Expert paddlers thought that a fire pit is a less important amenity for campgrounds than other paddler levels. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

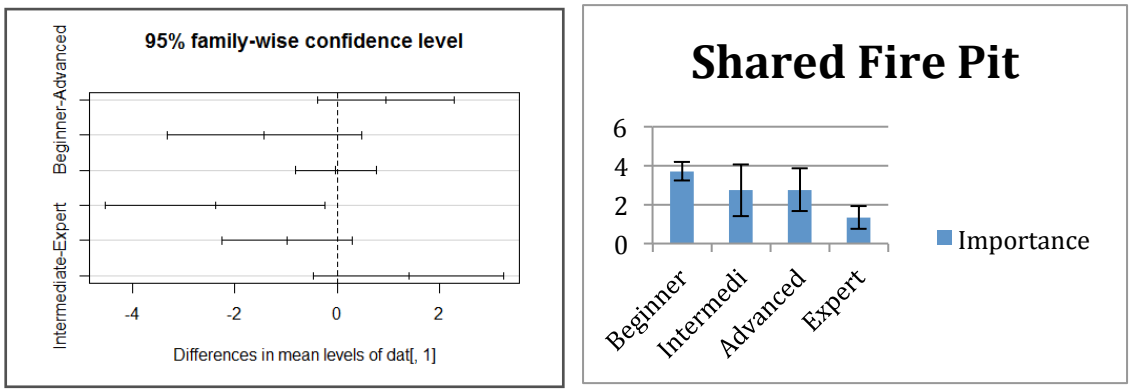


Figure. 56. Differences of preferences for campground amenities shared fire pit between each level paddlers. (p-value = 0.0371)

A shared fire pit is more important for beginner paddlers than for expert paddlers. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

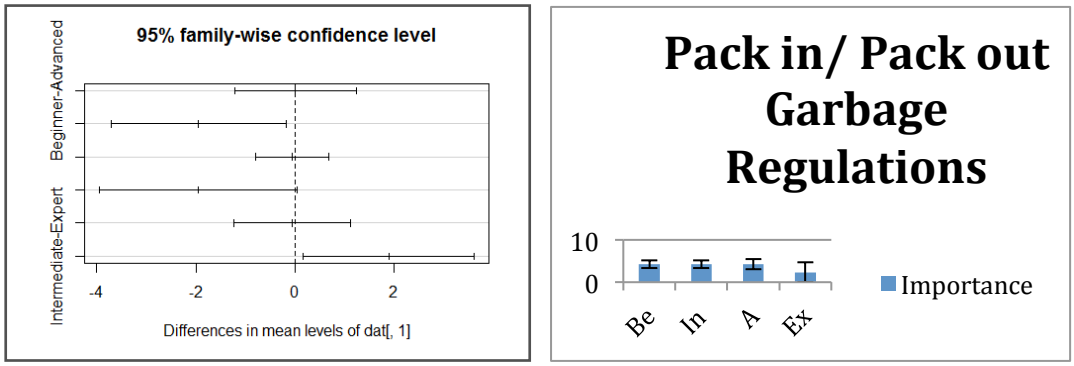


Figure. 57. Differences of preferences for campground amenities pack in/ pack out garbage regulations between each level paddlers.
(p-value = 0.03802)

Beginner, intermediate and advanced paddlers indicated their highest preference for pack in/pack out regulations. Interestingly, expert paddlers did not rank this amenity as of high importance. (The order of pairs in TukeyHSD following ANOVA for different level users is Beginner-Advanced, Expert-Advanced, Intermediate-Advanced, Expert-Beginner, Intermediate-Beginner, and Intermediate-Expert from top to bottom in the left graph.)

Answered: 65 Skipped: 14

	I would like to be close to the road for access.	(no label)	Neutral	(no label)	I would prefer a remote campsite, wildness experience. The farther from the road the better.	Total	Average Rating
(no label)	6.15% 4	1.54% 1	21.54% 14	21.54% 14	49.23% 32	65	4.06

Table. 3. Important of remote campsite to camping experience for paddlers.

Based on the survey result, there was also a tendency for paddlers to prefer a remote, wilderness experience for the camping. However, the tendency of paddlers was not as extreme as that of the backpackers.

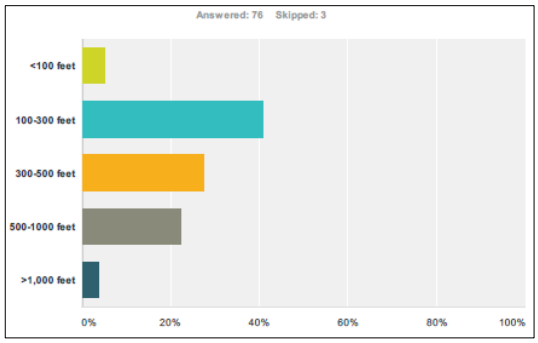


Figure. 58. What is the longest distance you are willing to camp from the lake?

A large proportion of respondents indicated a distance of 100-300 feet as their first preference. The next two preferences were a distance of 300-400 and 500-1000 feet for a camp from the lake. The least preferable options were for campsites less than 100 feet or more than 1000 feet from the lake.

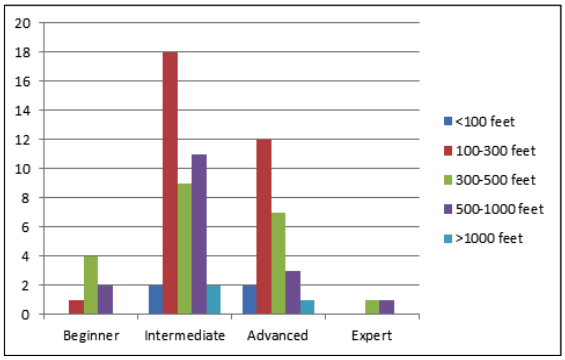


Figure. 59. The longest willing distance to camp from the lake of each level paddlers. (p-value = 0.695)

A closer look suggests that beginner paddlers have the highest preference for a camsite to be 300-500 feet from the lake. Both intermediate and advanced paddlers were not averse to any one option but did have a strong liking for a campsite 100-300 feet from the lake. Beginner and expert paddlers both indicated their non-preference for anything less than 100 feet or more than 1000 feet.

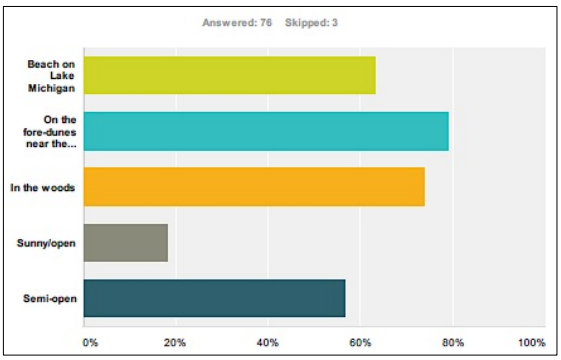


Figure. 60. What types of campsites would you prefer?

When it came to types of campsite, paddlers preferred either a campsite on the foredunes near the beach or set in the woods. The least preferred option was to camp in a sunny or open location.

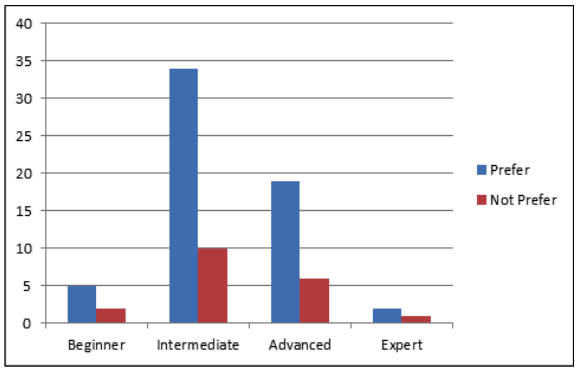


Figure. 61. Preferences of each level paddlers for campsites on the foredunes near the beach. (p-value = 0.967)

A high proportion of responses of all paddlers showed a preference for a campsite set in the foredunes near the beach. Intermediate paddlers had the strongest preference for such a site.

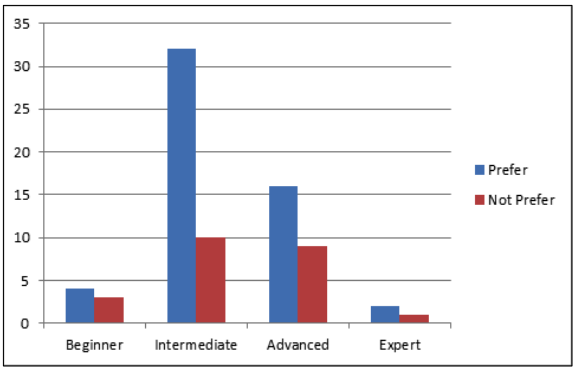


Figure. 62. Preferences of each level paddlers for campsites in the woods. (p-value = 0.6224)

The preference for a campsite in the woods was similar to the preference for a campsite set in the foredunes near the beach.

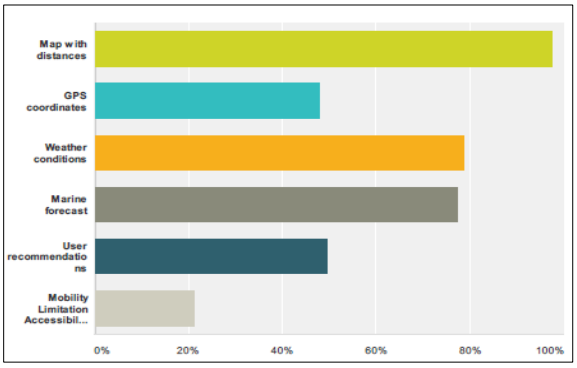


Figure. 63. What kind of information do you expect to get before or during your trip?

A high proportion of paddlers wanted a map with distances as a tool for information before or during the trip. The survey respondents also indicated a strong preference for knowing the weather conditions and the marine forecast related to their trip. The least preferred information was ADA accessibility guidance for the trail, launch and campground facilities.

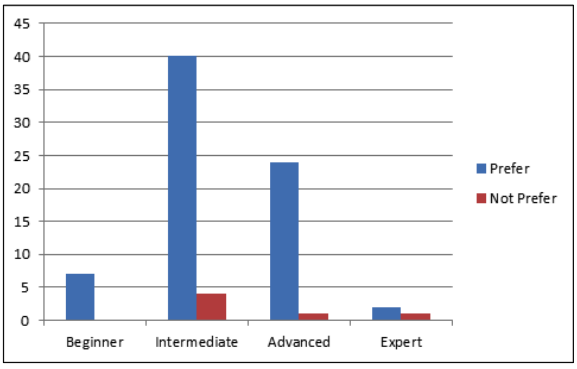


Figure. 64. Preferences of each level paddlers for information of map with distance. (p-value = 0.2606)

Virtually all the beginner paddlers indicated a preference for a map with distances as their first source of information before or during a paddling trip. Similarly, intermediate, advanced and expert paddlers were also inclined to prefer a map with distances.

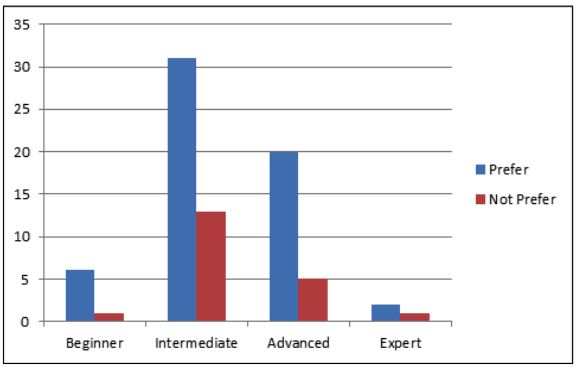


Figure. 65. Preferences of each level paddlers for information of weather conditions.
(p-value = 0.7191)
Most of the paddlers also showed a strong preference for knowing the weather conditions before or during a paddling trip.

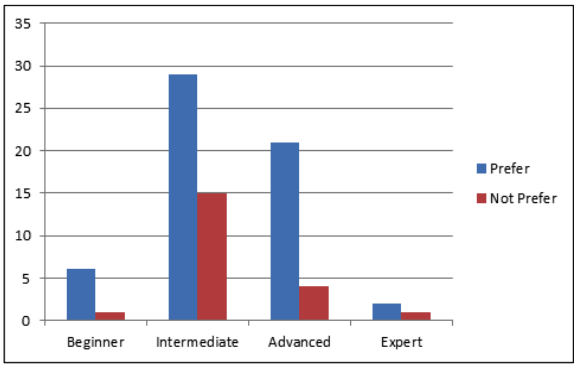


Figure. 66. Preferences of each level paddlers for information of marine forecast. (p-value = 0.3451)
Similarly, the paddlers also liked the idea of having access to a marine forecast before or during a trip.

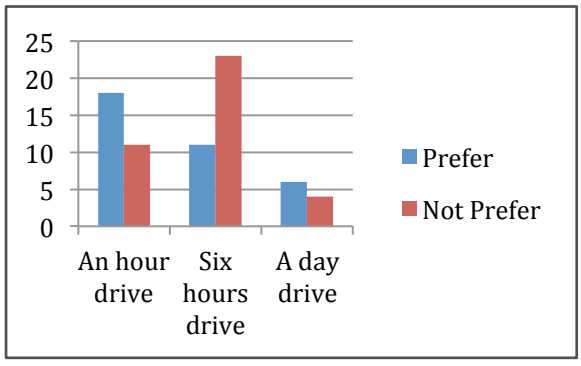


Figure. 67. Preferences of each group paddlers based on the distances from their houses to Sleeping Bear Dunes for information of user recommendations.
(p-value = 0.04478)
The groups categorized by their travel time to Sleeping Bear Dunes showed different preference in user recommendations.

C. Stakeholder Interviews

Question for College Outing Clubs

College/University:

Club:

Contact Person:

Contact Info:

Background:

The Bay to Bay Trail will provide visitors to Sleeping Bear Dunes with 35 miles of new backcountry hiking, camping, and paddling opportunities, traversing the length of the park. It will provide hikers and paddlers better access to areas of the Park to enjoy wilderness and "backcountry" recreational experiences, connect the backcountry campgrounds, and identify new campgrounds which could also be used by kayakers. Working with stakeholder groups, the project team will also identify possible locations for adaptive kayak launches and campsites for mobility impaired visitors. The Bay to Bay water trail will be part of the Lake Michigan Water Trail, a four state effort to create a 1,640 mile contiguous water trail along the Lake Michigan shoreline.

What are some of the activities that your club does?

How many members are in your club? How many active members do you have?

Where do you usually take trips?

What level of experience/expertise would you classify most of your members as having in hiking/backpacking?

mostly beginner	beginner/intermediate	intermediate
intermediate/advanced	advanced	even mix across beginner, intermediate, advanced

in kayaking?

mostly beginner	beginner/intermediate	intermediate
intermediate/advanced	advanced	even mix across beginner, intermediate, advanced

How do you obtain information for the various hiking, kayaking and other outing trips in which your group participates?

Does your club take trips to this area of Michigan (Sleeping Bear Dunes, Traverse City, Pictured Rocks)? Have they in the past?

If yes, where and what activities has your club partaken in there?

Would you forsee your club visiting Sleeping Bear Dunes to use the Bay to Bay Trail in the future?

If so, how would you see your club using the trail?

•day trip (hiking)

•day trip (paddling)

•multi-day trip (backpacking)

•multi-day trip (paddling)

•multi-day trip (backpacking & paddling)

What is the trail (water trail or backpacking trail) experience that you think your club members are hoping for?

Would you and/or your club members be interested in participating in the planning of the trail through a user group survey?

Question for outfitters

Are you aware of the proposed plans for the new hiking and water trails and accompanying camping sites at Sleeping Bear Dunes Lakeshore?

Do you feel there is a need for a water trail with backcountry campgrounds connected by a hiking trail in Sleeping Bear Dunes Lakeshore area?

How do you obtain information about the various hiking, kayaking and camp sites with the Sleeping Bear Dunes Lakeshore area?

What is the trail (water trail or backpacking trail) experience that you think your customers are hoping for?

As an outfitter, what kind of facilities would you like offered at the kayak launch points? What kind of facilities do you think the customers might need at the launch sites (cell phone coverage, toilets, potable water, etc.)

With this new water trail – backpacking trail in Sleeping Bear Dunes National Lakeshore, what kind of communications would you like to have with the Park? What forms of communication exist between the various outfitters near and around the Sleeping Bear Dune Lakeshore?

What services or products (shuttles, equipment and gear) do you currently offer?

Do you anticipate any change in business for outfitters such as yourself from the addition of a hiking/water trail?

Is your business likely to benefit from these new additions? If so, do you foresee an expansion in a particular area of your business as a result of these new trails (number of customers X sales/customer)?

Are you planning on conducting some programing, such as orienteering, equipment familiarization, training etc. for your client/customers?

Moving forward with this process, what are the three most important areas of concern you feel need to be addressed (e.g. details on development of kayak launch sites, campsite locations, and distance between various sites)?

1.
2.
3.

How would you like to be involved in the development of this new trail system?

Organization you represent
Business zip code

Question for outfitters

Interview with Matt Wiesen (Crystal River) 10/23

(231) 642-7997

Are you aware of the proposed plans for the new hiking and water trails and accompanying camping sites at Sleeping Bear Dunes Lakeshore?

Barbara N.J. told about the plan. Fundraising committee for Heritage Trail

Do you feel there is a need for a water trail with backcountry campgrounds connected by a hiking trail in Sleeping Bear Dunes Lakeshore area?

Definitely a need for more camping sites, esp. backcountry. Concern: water safety in L. Michigan. Customers overestimate skill, underestimate power of L. Michigan. People on vacation are difficult to engage w/ safety education. Key: require a float plan. Strong emphasis on hiking part of trail, paddling part should be secondary and for experts.

How do you obtain information about the various hiking, kayaking and camp sites with the Sleeping Bear Dunes Lakeshore area?

Grew up near SLBE. Good relationship w/ park.

What is the trail (water trail or backpacking trail) experience that you think your customers are hoping for?

Target person: coming from city. big trip of the year. Spend $ and time on maps, links from campsite to campsite.

As an outfitter, what kind of facilities would you like offered at the kayak launch points? What kind of facilities do you think the customers might need at the launch sites (cell phone coverage, toilets, potable water, etc.)

restrooms, water would be nice, designated parking- esp. for boat launches.

With this new water trail – backpacking trail in Sleeping Bear Dunes National Lakeshore, what kind of communications would you like to have with the Park? What forms of communication exist between the various outfitters near and around the Sleeping Bear Dune Lakeshore?

As water conditions change, there should be clear communication with outfitters, users about safety. Users might need to camp out extra days. Outfitters may need to pick up earlier or drop off later.

What services or products (shuttles, equipment and gear) do you currently offer?

rent kayaks, SUP, canoes, bikes. sell bikes, SUP boards. Shuttle services to Crystal river. some camping gear.

Do you anticipate any change in business for outfitters such as yourself from the addition of a hiking/water trail?

Camping gear offerings could expand. Shuttle service to L. Michigan would be challenging.

Is your business likely to benefit from these new additions? If so, do you foresee an expansion in a particular area of your business as a result of these new trails (number of customers X sales/customer)?

Marketing should be toward expert paddlers (already have their own gear)

Are you planning on conducting some programing, such as orienteering, equipment familiarization, training etc. for your client/customers?

Moving forward with this process, what are the three most important areas of concern you feel need to be addressed (e.g. details on development of kayak launch sites, campsite locations, and distance between various sites)?

1. Water Safety

2. Emphasis should be on hiking trail - expands user base, and season

3. campsite distances should be achievable within a day

How would you like to be involved in the development of this new trail system?

Yes- meeting w/ Kerry in December. Willing to work with surveys.

Organization you represent
Business zip code

Question for College Outing Clubs

College/University: **Hope College** (Holland, MI)

Club: **Hope College Outdoor Adventures**

Contact Person: **Austin Homkes**

Contact Info: **austin.homkes@hope.edu**, **616-566-2084**

Background:

The Bay to Bay Trail will provide visitors to Sleeping Bear Dunes with 35 miles of new backcountry hiking, camping, and paddling opportunities, traversing the length of the park. It will provide hikers and paddlers better access to areas of the Park to enjoy wilderness and "backcountry" recreational experiences, connect the backcountry campgrounds, and identify new campgrounds which could also be used by kayakers. Working with stakeholder groups, the project team will also identify possible locations for adaptive kayak launches and campsites for mobility impaired visitors. The Bay to Bay water trail will be part of the Lake Michigan Water Trail, a four state effort to create a 1,640 mile contiguous water trail along the Lake Michigan shoreline.

What are some of the activities that your club does?

indoor climbing gyms, day hikes; towards larger groups with less experience 15-25 people, winter hiking, skiing, snow shoeing, backpacking (Pictured Rocks), biking

How many members are in your club? How many active members do you have?

listserv: 400 (largest at Hope); 35-40 active- 25-30 are involved year-round

Where do you usually take trips?

Pictured Rocks, Manistee National Forest, Red River Gorge

What level of experience/expertise would you classify most of your members as having in hiking/backpacking? Many people haven't had the opportunity

mostly beginner | beginner/intermediate | intermediate

intermediate/advanced | advanced | even mix across beginner, intermediate, advanced

in kayaking?

mostly beginner | beginner/intermediate | intermediate

intermediate/advanced | advanced | even mix across beginner, intermediate, advanced

How do you obtain information for the various hiking, kayaking and other outing trips in which your group participates?

Member experience- president is from Holland, MI, knows the area well

Does your club take trips to this area of Michigan (Sleeping Bear Dunes, Traverse City, Pictured Rocks)? Have they in the past?

Pictured Rocks

If yes, where and what activities has your club partaken in there?

4-day break- backpacking the lakeshore

Would you foresee your club visiting Sleeping Bear Dunes to use the Bay to Bay Trail in the future?

Yes. One hinderance now is the lack of a multi-day hiking trail. Worth the time to spend a weekend if the longer Bay-to-Bay trail was built.

If so, how would you see your club using the trail?

•day trip (hiking)

•day trip (paddling)

•multi-day trip (backpacking)

•multi-day trip (paddling)

•multi-day trip (backpacking & paddling)

Club has backpacks, tents, camping equipments (limited), no boats

What is the trail (water trail or backpacking trail) experience that you think your club members are hoping for? (difficulty of activity, feeling of remoteness, etc.)

Very important to feel somewhat secluded/ out in nature- particularly important for the campsites. Trail should be accessible, but nothing in SLBE would be too difficult for members.

Would you and/or your club members be interested in participating in the planning of the trail through a user group survey?

Yes.

Question for College Outing Clubs

College/University: Michigan State University

Club: MSU Outdoor Club

Contact Person: Drew Vandegrift (Presient MSUOC), Tim Muhich, Elyse Kutsche

Contact Info: Vandeg10@msu.edu , 616 916 6307

Muhichti@msu.edu , 313 806 6596

elysekutsche@gmail.com , 208 360 6773

Background:

The Bay to Bay water trail will be part of the Lake Michigan Water Trail, a four state effort to create a 1,640 mile contiguous water trail along the Lake Michigan shoreline. The Bay to Bay Trail will provide visitors to Sleeping Bear Dunes with 35 miles of new backcountry hiking, camping, and paddling opportunities, traversing the length of the park. It will provide hikers and paddlers better access to areas of the Park to enjoy wilderness and "backcountry" recreational experiences, connect the backcountry campgrounds, and identify new campgrounds which could also be used by kayakers. Working with stakeholder groups, the project team is in the process of identifying possible locations for adaptive kayak launches and campsites for mobility impaired visitors.

What are some of the activities that your club does?

Rock climbing, hiking, camping, canoeing

Weekend trips – Grand Ledge (rock climbing, hiking and camping), Manistee River (Canoeing), Nordhouse Dunes (hiking)

Big event in – East Lansing to Lake Michigan via rivers (canoeing and portage)

How many members are in your club? How many active members do you have?
listserv: 700; 100 active- 30 are involved year-round
Where do you usually take trips?
Wilderness State Park – rustic cabin
Grand Ledge
Planet Rock for climbing
Red Cedar River – kayaking
Smoky Mountains, Kentucky, for longer and out of state trips
What level of experience/expertise would you classify most of your members as having

in hiking/backpacking? Many people haven't had the opportunity
mostly beginner beginner/intermediate intermediate
intermediate/advanced advanced even mix across beginner, intermediate, advanced

in kayaking/canoes?
mostly beginner beginner/intermediate intermediate
intermediate/advanced advanced even mix across beginner, intermediate, advanced

How do you obtain information for the various hiking, kayaking and other outing trips in which your group participates?
Member experience, Online information gathering

Does your club take trips to this area of Michigan (Sleeping Bear Dunes, Traverse City, Pictured Rocks)? Have they in the past?
Sleeping Bear Dunes area – 2-3 times a year

If yes, where and what activities has your club partaken in there?
Weekend trips, 20-50 people, hiking, not too much kayaking

Would you foresee your club visiting Sleeping Bear Dunes to use the Bay to Bay Trail in the future?
Yes. A lot of interest.

If so, how would you see your club using the trail?
•day trip (hiking)
•day trip (paddling)
•multi-day trip (backpacking)
•multi-day trip (paddling)
•multi-day trip (backpacking & paddling)
Multiday hiking/kayaking/ paddling

What is the trail (water trail or backpacking trail) experience that you think your club members are hoping for? (difficulty of activity, feeling of remoteness, etc.)
Tranquility, peacefulness, solitude, feeling of remoteness, higher level of difficulty

Would you and/or your club members be interested in participating in the planning of the trail through a user group survey?
Yes. They would be willing to send our link for the surveys with their members.

Question for College Outing Clubs

College/University: Northwestern University

Club: Northwestern University Outing Club (NUOC)

Contact Person: Conner Dykstra

Contact Info: connerdykstra2014@u.northwestern.edu

Background:

The Bay to Bay Trail will provide visitors to Sleeping Bear Dunes with 35 miles of new backcountry hiking, camping, and paddling opportunities, traversing the length of the park. It will provide hikers and paddlers better access to areas of the Park to enjoy wilderness and "backcountry" recreational experiences, connect the backcountry campgrounds, and identify new campgrounds which could also be used by kayakers. Working with stakeholder groups, the project team will also identify possible locations for adaptive kayak launches and campsites for mobility impaired visitors. The Bay to Bay water trail will be part of the Lake Michigan Water Trail, a four state effort to create a 1,640 mile contiguous water trail along the Lake Michigan shoreline.

What are some of the activities that your club does?

year-round activities: camping, kayaking, canoeing, ice skating, skiing, rock climbing. Day trips or 2 day trips (weekend). Spring break trip- hiking and rafting. WI- hiking, MI- luge.

How many members are in your club? How many active members do you have?

15-20 on large trips. Listserv is very large (100-200) about 50 members pay dues

Where do you usually take trips?

WI (Devil's Lake), MI, KY (Red River Gorge), IN (Indiana Dunes)

What level of experience/expertise would you classify most of your members as having in hiking/backpacking?

mostly beginner beginner/intermediate intermediate
intermediate/advanced advanced even mix across beginner, intermediate, advanced

in kayaking?
mostly beginner beginner/intermediate intermediate

intermediate/advanced	advanced	even mix across beginner, intermediate, advanced

How do you obtain information for the various hiking, kayaking and other outing trips in which your group participates?

Internet sources, other schools' outing clubs, faculty advisor member

Does your club take trips to this area of Michigan (Sleeping Bear Dunes, Traverse City, Pictured Rocks)? Have they in the past?

No

If yes, where and what activities has your club partaken in there?

Would you foresee your club visiting Sleeping Bear Dunes to use the Bay to Bay Trail in the future?

Yes- very appealing to have the water trail component

If so, how would you see your club using the trail?

•day trip (hiking)

•day trip (paddling)

•multi-day trip (backpacking)

•multi-day trip (paddling)

•multi-day trip (backpacking & paddling)

What is the trail (water trail or backpacking trail) experience that you think your club members are hoping for?

secluded, remote trail.

workout hiking & paddling, but not terribly difficult- accessible to all members.

Would you and/or your club members be interested in participating in the planning of the trail through a user group survey?

Yes, would be happy to take user group survey and send out survey link over the listserv.

D. Water Trail Access Point Assessment Form

Michigan's Great Lakes Water Trails

Asset Record Form

Use this form to record an asset in the field, and then enter it on the water trails website.

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person):	
Location Phone:	
Location Email:	
Location Website:	

Location Amenities (add notes if applicable):

- ☐ ADA Accessible
- ☐ Boat Storage ____rack _____secured rack with lock
- ☐ Fee ____parking ___entrance/launch Amount?_____
- ☐ Camping ____rustic (area for tents and restrooms) ____improved (electric, running water, showers)
- ☐ Lighting
- ☐ Parking ___parking lot ____dead end/road end ___on-street ___ on road shoulder
- ☐ Picnic Area
- ☐ Power
- ☐ Restrooms ___pit ____flush
- ☐ Shelter (not overnight use)
- ☐ Potable Water
- ☐ WiFi

Boat Access Type (if Water Access): ☐ Developed ☐ Carry-In ☐ Alternate

Length/Ease: _____ more than 50 yards ____less than 50 yards
Notes on significant encumbrances (hills, sand, vegetation, rocks) from parking area to launch area:

Access Site Sign: _____in the water/on shore/bank (visible from water) _____along road (visible from road)

Nearby Local Outfitter: ___just rentals _____just rentals including transport of boat ____rentals and tours

over

Description (interesting or unique features about the access site other amenities, things to note, and anything else important about this location):	
Date & Time:	Your Name:

E. Campground Matrix & completed matrixes for assessed campgrounds

Campground Assessment Matrix

Evaluation Factors	Campground Option 1	Campground Option 2	Campground Option 3
Endangered Species			
Archeology			
Number of Campsites			
Distance from Lake Michigan			
Distance to Trail Head			
Universal Accessibility			
Drainage			
Privacy			
Soundscape			
Water Availability			
Protection from Wind			
Soil Type			
Sun Exposure			
Environment Impacts			
Potential campground style			
Target users			
Cell Phone Reception			
Forest type			

EVALUATION FACTORS AND SCORING

(A: Preferred B: Adequate C: Not Recommended)

- **Number of Campsites: The number of potential campsites that a campground could accommodate. One campsite is generally 215 ft^2/20 m^2.**

A. > 10
B. 5-10
C. < 5

- **Distance to Trailhead: The distance of the campground to the nearest hiking trailhead.**

A. >1.0 miles
B. 0.3 – 1.0 miles
C. < 0.3 miles

- **Universal Accessibility: The degree to which the campground is accessible from the trail and/or beach**

A. Meets ADA accessible trail requirements:

Cross Slope
- 5% max

Running slope:
- 5% or less for any distance
- up to 8.33% for 200' max. Resting intervals no more than 200' apart
- up to10% for 30' max. Resting intervals 30'
- up to 12.5% for 10' max. Resting intervals 10'
- no more than 30% of the total trail length may exceed a running slope of 8.33%
- clear tread width: 36" minimum
- tread obstacles: 2" high maximum (up to 3" high where running and cross slopes are 5% or less)

B. Does not meet ADA accessible trail requirements (list requirements not met)

- **Drainage: A slope less than 2% can present problems for surface water drainage.**

A. > 2%, good drainage
B. < 2%, poor drainage without modification

- **Privacy: Based on topography and vegetative cover.**

A. Valley-shaped topography, each campsite/campsite group has a well-defined space

B. Slightly undulating terrain, or tree canopies and open space to define space of each campsite
C. Flat area without any vegetation or other landscape element to define space

- **<u>Soundscape:</u> The degree to which the campground is inundated by sound. Campground topography, distances between campsites, and distances to nearby roads and trails are considered.**

A. Low (natural sounds)
B. Moderate (talking)
C. High (noisy)

- **<u>Distance from Lake Michigan:</u> Distance between the campground and the water, generally referring to the ease of accessing the campground from the beach.**

A. <300 feet
B. 300 – 1000 feet
C. >1000 feet

- **<u>Water Availability:</u> The availability of drinking water from the campground.**

A. Potable water source available at campground
B. Accessible to Lake Michigan - campers must filter water for drinking
C. No water available - campers must carry in water

- **<u>Cell Phone Reception:</u> Strength of cell phone reception at the campground.**

A. Strong
B. Weak
C. No signal

- **<u>Target Users</u>**: Primary users the campground will serve. Inland campgrounds will likely be used more by hikers, while campgrounds closer to the lakeshore will primarily serve paddlers.

- **<u>Protection from Wind:</u> Degree to which campsites are sheltered from wind based on topography around the campground and distance from nearest body of water.**

A. Topography and dense vegetation provide protection from significant wind
B. Topography and vegetation can mitigate wind exposure
C. No protection from wind exposure

- **<u>Archeology:</u> Whether there are any sites of historical or archeological significance in the immediate area.**

A. None
B. Site(s) nearby, but not within the campground

C. Site(s) within the campground

- **<u>Soil Type</u>: Coarser soils have higher rates of permeability; important for surface water drainage.**

A. sand
B. loam
C. clay

- **<u>Sun Exposure:</u> Percentage of sun exposure through canopy over the campground; also important for thermal comfort.**

A. 20-60% (grove)
B. 0-20% (dense forest) or 60-100% (sparse canopy)

- **<u>Environmental Impacts:</u> The degree to which the campground site has already been impacted by humans. Deforestation and erosion are used as primary indicators.**

A. Previously disturbed landscape far from wild life/endangered species habitats
B. Undisturbed landscape which is close to wild life/endangered species habitats
C. Fragile landscape within wild life/endangered species habitats

- **<u>Forest Type:</u> Tree species identified onsite, including primary, native, exotic, and endangered species. Seasonal changes (i.e. canopy coverage) shall be noted for ecological and aesthetic reasons.**

- **<u>Endangered Species:</u> Species of organisms that will likely become extinct.**

- **<u>Campground Style:</u> Whether the campground would best support dispersed camping zones, rotational-use campsites, or designated campsites based on the factors and evaluations below.**

A. Rotational-use campsites; appropriate for remote sites with sensitive landscapes, less than 15 acres without facilities. Would accommodate 4-5 campsites, 2-3 of which could be occupied at a time. Campsite availability would rotate to reduce concentrated impacts.
B. Dispersed camping zones; appropriate for remote sites, less than 10 acres without facilities. Would accommodate 2-3 campsites in a camping zone (no tent-pads).
C. Designated campsites. Would contain 2-3 tent-pads and may include connector paths between designated campsites.

F. Brochure Mock-up & Design Guidelines

Brochure Front

Bay to Bay Trail

Sleeping Bear Dunes
National Lakeshore
Michigan

National Park Service
U.S. Department of the Interior

B2B Bay Paddling on Lake Michigan
B2B Ways of Exploring
B2B Backcountry Backpacking

Bay to Bay Backpack and Water Trail

The Bay to Bay Trail provides visitors to Sleeping Bear Dunes with 35 miles of new backcountry hiking, camping, and paddling opportunities, traversing the length of the Park. It provides hikers and paddlers access to areas of the Park to enjoy wilderness and "backcountry" recreational experiences. The Bay to Bay water trail is part of the Lake Michigan Water Trail, a four state effort to create a 1,640 mile contiguous water trail along the Lake Michigan shoreline.

The Bay to Bay Backpack and Kayak Trail generally runs parallel to the mainland shoreline within Sleeping Bear Dunes National Lakeshore boundaries from Platte Bay to Good Harbor Bay. On land, this trail makes use of active beaches and existing disturbed areas and corridors. The trail provides backpackers as well as Lake Michigan kayakers and canoeists a way to do multi-day trips. Campgrounds are close enough to the Lake Michigan shore that paddlers can carry their equipment from their boats to the campground.

The hiking trail allows backpackers to do multi-day backpacking trips using the same campgrounds that would be used by paddlers, so mixed groups of paddlers and backpackers can start at the same point and meet for camping in the evening. Visitor maps show the kayak launch sites, hiking trail, campgrounds, and access points to the trail from existing roads in the National Lakeshore. Some additional primitive backcountry campgrounds have been built to provide more overnight camping along the way.

Long ago, an enormous forest fire on the western shore of Lake Michigan drove a mother bear and her two cubs into the lake determined to reach the opposite shore. After many miles of swimming, the exhausted cubs drowned in the lake, but the mother bear stayed and waited on the top of a high bluff in hopes that her cubs would finally appear. Impressed by the mother bear's determination and faith, the Great Spirit created two islands (North and South Manitou Island) to commemorate the cubs, and the winds buried the sleeping bear under the sands of the dunes where she waits to this day.

- The Chippewa Legend of Sleeping Bear

A Masterpiece of Ice, Wind and Water

The shoreline, hills and valleys, many small lakes, and sand dunes you see today are evidence that the powerful earth-moving forces of ice, wind, and water have been at work here. Often geological changes occur slowly over millions of years, but here you can see dramatic changes within your lifetime. Twice in the 1990s landslides at Sleeping Bear Point sent large land masses plunging into Lake Michigan. In a matter of years, trees disappear as shifting dunes bury them under a blanket of sand. Such changes make Sleeping Bear Dunes an exciting place to visit again and again.

During the ice age continental glaciers spread southward from Canada, repeatedly burying this area under sheets of ice. These massive glaciers enlarged river valleys, carving out the wind, deep basins of the Great Lakes. They deposited huge piles of sand and rock debris when they melted, leaving behind the hilly terrain and shoreline bluffs you see today. Finally, 11,800 years ago, the last glacier retreated.

With the glacial landscape formed, Lake Michigan and many smaller lakes began to take shape. The level of water filling Lake Michigan's ice-carved basin rose and fell many times before reaching its present level. The lake's shoreline — at first irregular with jutting headlands and recessed bays — was gradually smoothed out. Waves wore back the headlands. Shoreline currents carrying sediments built sandbars and spits across bay mouths. Sometimes sediments dammed bays, creating small inland lakes like Glen Lake, North and South Bar Lakes near the Lake Michigan shoreline. Receding Lake Michigan water levels have left a series of old beach lines that remain as alternating and contrasting low ridges and swale.

Photo description for these three photoes Photo description for these three photoes Photo description for these three photoes

The glaciers left behind an ideal setting for building sand dunes: a sandy coast on the windward side of Lake Michigan. Prevailing westerly winds blowing across the lake build two kinds of dunes in here. Beach dunes develop on low-lying shores of Lake Michigan, The Aral Dunes, along Platte Bay's north shore, are good examples of beach dunes. Perched dunes, on the other hand, sit high above the shore on plateaus. Glacial sands atop these surfaces supplied material for these dunes. The Sleeping Bear dune of Anishinaabek Indian legend is a perched dune. Some dunes migrate, pushed by the wind. Sometimes shifting sands bury trees. As the dunes move on, ghost forests of dead trees are exposed, stark reminder os the dunes' passing.

More than Hiking, Kayaking, and Camping

No matter what the season, there is plenty to do at the Sleeping Bear Dunes National Lakeshore. The new Sleeping Bear Heritage Trail provides over 4 miles of paved trail for family and friends to ride bikes, walk, cross-country ski, or snowshoe.
The 35 miles of mainland Lake Michigan beaches offer great swimming and sunbathing in the summer and incredible views for a quiet hike at any time of the year. Kayakers will find several good access points to Lake Michigan and for those who want to float the rivers, bring your boat or tube or rent them here and enjoy a leisurely float on the Platte or Crystal rivers.

Hunters and fishermen will also find many opportunities.

Photo description for these three photoes Photo description for these three photoes Photo description for these three photoes

B2B Bay, Lakes, Streams and Bog
B2B Islands of Lake Michigan
B2B Bird watching, wildlife viewing

The lakeshore is a veritable treasure for birders who want to add species to their lists. So far 240 species of birds have been identified within the lakeshore. Kayaking or hiking on B2B trail offers you different vantage points for watching birds.

Landscapes, Wildlife, and Exploration

With 35 miles of Lake Michigan shoreline and numerous inland lakes and streams, the park is wonderfully water oriented. If the wind and waves of Lake Michigan make paddling hazardous, explore some of our inland lakes, rivers, or streams.

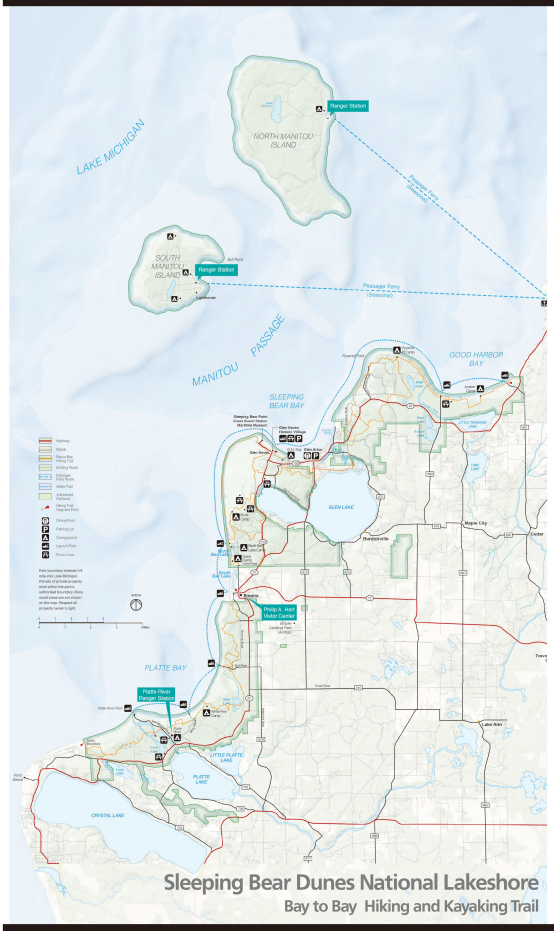
The National Lakeshore has excellent representations of several northern hardwood and conifer forest types, abandoned farm site meadows, wetlands, lakes, streams, and bogs. Whether you are on the sandy bluffs overlooking Lake Michigan, in a canoe on one of the many inland lakes, or hiking the myriad of trails through the forest, you will have a wonderful opportunity for bird watching, wildlife viewing, and for just enjoying nature at its best.

Brochure Back

Bay to Bay Trail

Sleeping Bear Dunes
National Lakeshore
Michigan

National Park Service
U.S. Department of the Interior



Bay to Bay Hiking and Water Trail

Hiking | **South Boundary to Platte River**

Explore the Old Indian Trail before crossing into the Boekeloo swamp to walk glacial ridges along wilderness wetlands. Hikers have to wade across the Platte River – depth of water about 3 feet.
Trail Length: x miles Difficulty: Beginning

Platte River to Empire

This trail segment provides opportunities to explore woodland wilderness, creeks, inland lakes and views of Lake Michigan. One backcountry campground (White Pine)
Trail Length: x miles
Difficulty: Intermediate – Hills south of Empire

Empire to Glen Haven

Walk along dunes or the beach or follow the pleasant paved Heritage Trail, you have multiple choices in this segment when plan your trip.
Trail Length: x miles
Difficulty: Intermediate – Hills and dunes north of North Bar Lake
Beginner if you follow the SBHT

Glen Haven to Good Harbor Bay

This trail segment offers options of a challanging, breathtaking bluff trail or a casual inland trail.
Trail Length: x miles
Difficulty: Intermediate – Alligator Hill and Valley View or along Lake Michigan bluffs

Water Trail

Part of the Lake Michigan Water Trail, the Bay to Bay water trail extends from the Platte River north to Good Harbor Bay Launch Point. Six additional launch points along the way enable day excursions and multi-day trips.
Trail Length: x miles
Difficulty: Intermediate to Advanced – depending on weather and wave height

* Notes: The Philip A. Hart Visitor Center has information, exhibits, and book. It is open daily except for Thanksgiving Day, December 25th and January 1st. Seasonal hours vary.

Visitor Center Start your visit at the Philip A. Hart Visitor Center to get your pass, maps, and much more information. It is open daily except Thanksgiving Day, December 25th and January 1st. Now map this,

Philip A. Hart Vistor Center
9922 Front Street
Empire, MI 49630
Front desk. (231) 326-4700 ext 5011
Email. slbe_interpretation@nps.gov

Camping Reservation Campers wishing to reserve a backcountry campsite along Bay to Bay can make reservation by phone or online.

- **Online** at: http://www.recreation.gov
- **Calling** the Reservation Center at 1-877-444-6777. The center is open daily:
  March 1 - October 31, 10:00 a.m. to 12:00 a.m. EST
  November 1 - February 28, 10:00 a.m. to 10:00 p.m. EST
- **Camping Fees**
  White Pine Campground (All year):
  6 Sites Total, x reservable, $5.00/night
  White Pine Campground (All year):
  6 Sites Total, x reservable, $5.00/night

If you do not have a reservation, you still have a good chance of getting a camping site, for there is a constant turn-over. For best results, arrive early in the morning to get a site.

Hiking Safety When hiking either in the woods or through the dunes, be sure to have a plan and communicate it with your group. Cell phone coverage is not always reliable in the Lakeshore especially in remote or wilderness areas.

Out on the dunes, it is easy to get turned around and lose your sense of direction. The best plan is to follow one of the marked hiking trails and carry a map and compass. The trails in the dunes are marked with blue-topped posts.

Kayaking/Paddling Safety Lake Michigan is beautiful - but upredictable! Kayakers must be prepared for cold tempreatures, high winds, fog, and rough seas that may occur at any time. Be constantly alert to changing conditions and you should consult the corrent marine forecast (NOAA 1-906-475-5212 or Marine Band Radio Channel 16) before starting any trip.

Leave your float plan with a friend or family member and tell them to call if you are overdue or an emergency arises. A float plan contains important information such as your name and address, vessel description, names of people in your group, safety equipment, planned route, length of trip and return date. When planning your trip, we suggest paddling no more than 10 miles per day for beginners or 15 miles per day for experienced paddlers. Night paddling or kayaking is not recommended.

More Information available online
www.nps.gov/slbe

Brochure Design Guidelines

Color Palette

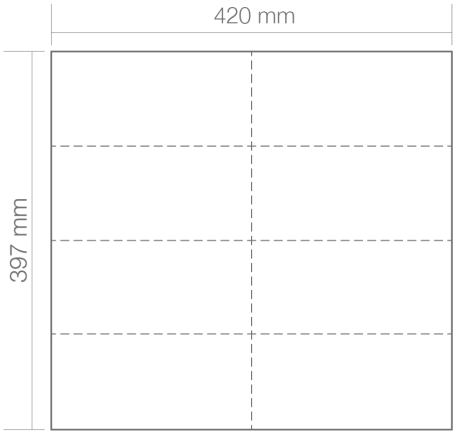
C 88
M 56
Y 23
K 0

C 13
M 43
Y 95
K 0

C 0
M 0
Y 0
K 50

C 0
M 0
Y 0
K 100

Dimensions



Typography

Header 1

Frutiger Bold, 36 pt

Header 2

Frutiger Bold, 24 pt

Text Body

Adobe Devanagari, Regular, 11 pt, Lead 13 pt

Text Body

Adobe Devanagari, Bold Italic, 11 pt, Lead 13 pt

Photo Description

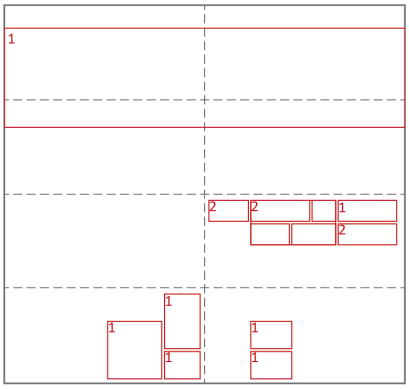
Frutiger Bold, 9 pt

Trail Segment Description

Calibri, Regular, 11 pt, Lead 13 pt

* Typography is changable according to license restrictions and park requirements.

Resources



1 Park resources or team members
2 Online resources

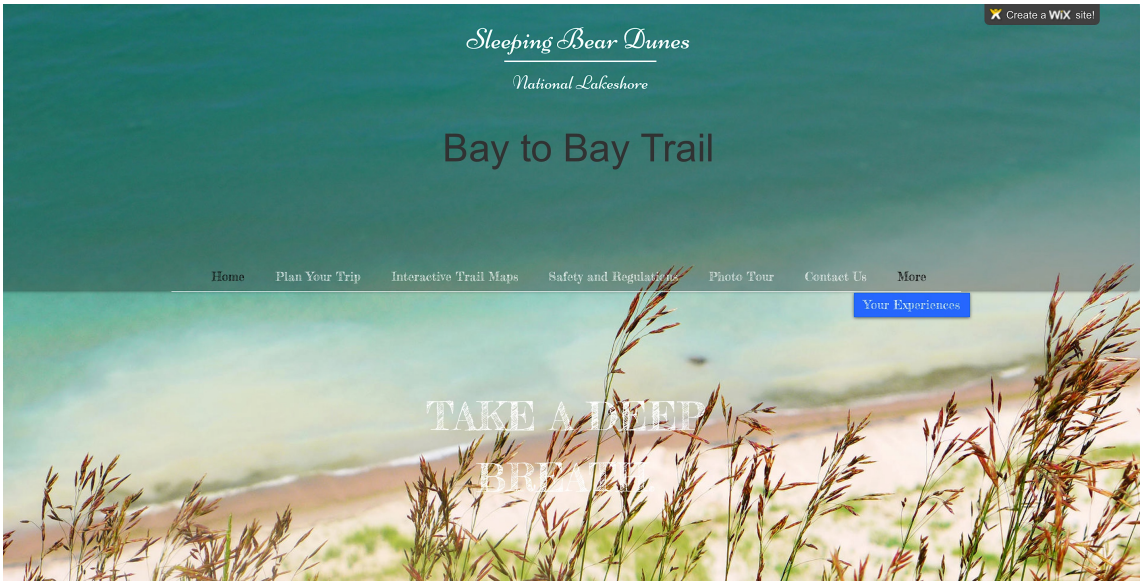
All the photos on 2-page are from park resources or team members.

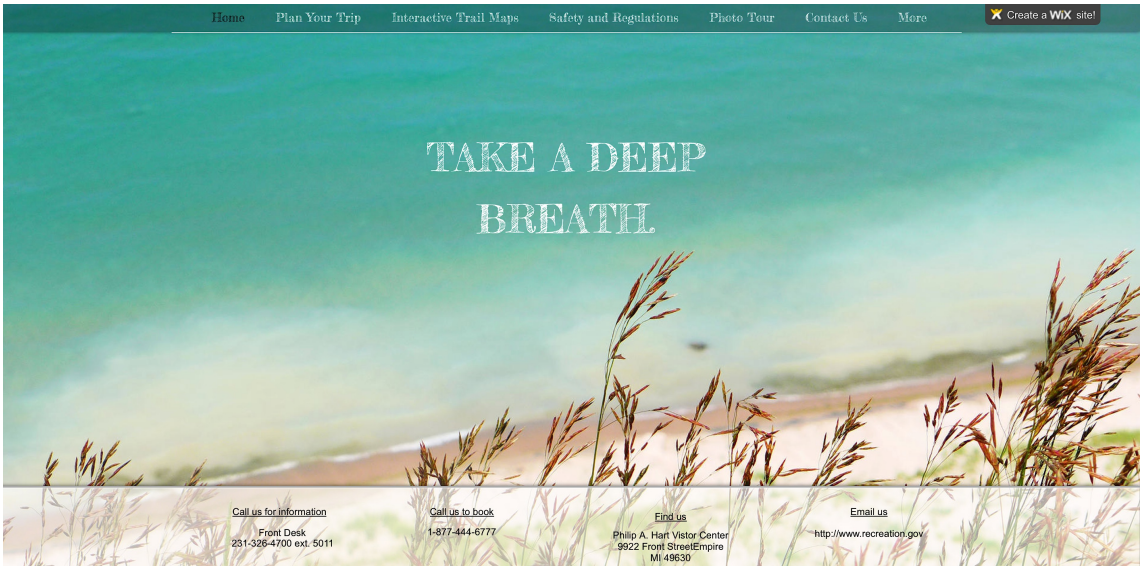
All the texts are from park resources or team members.

* Photos are changable according to copyright restrictions and park requirements.

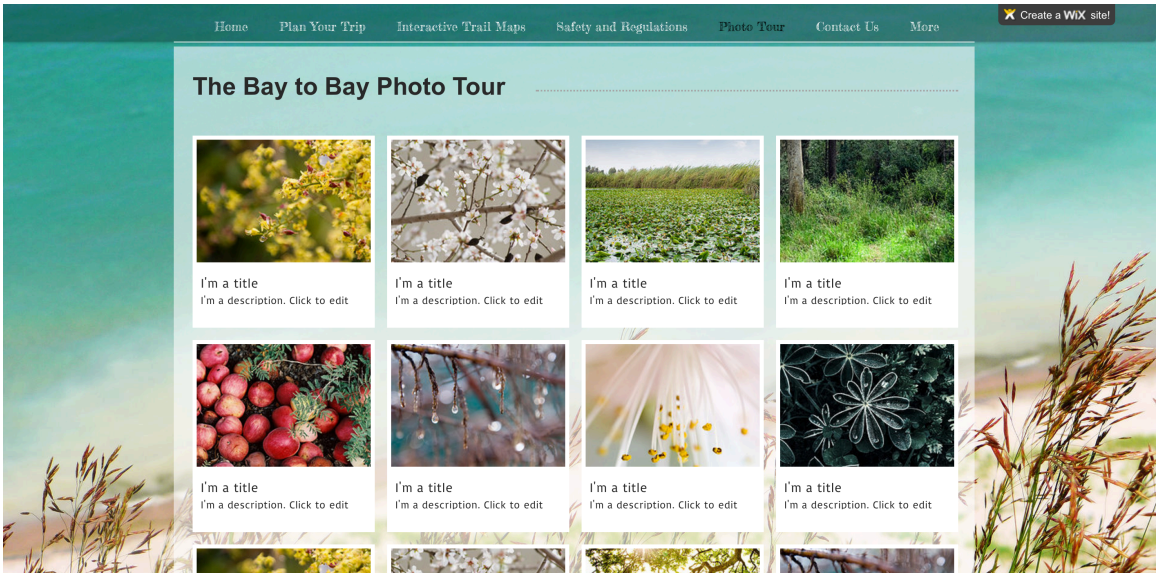
G. Website Mock-up

Homepage

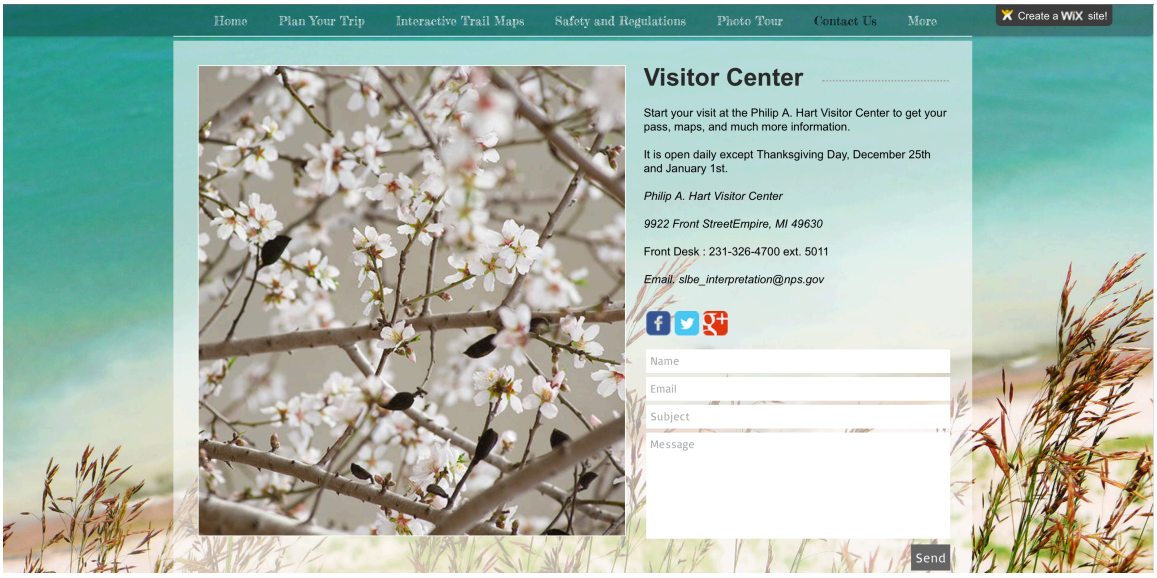




Subpage: Photo Gallery



Subpage: Contact



H. Campground Evaluation Form

SLBE Bay to Bay Trail

Campsite Record Form

Location Name:_____

directions/description:

_____

_____

Latitude:_____ **Longitude:**_____

approximate size:_____

terrain description (flat, rocky, sandy, vegetation, etc.):

_____

_____

Degree of shelter from the elements:

(exposed) (well sheltered)

1 2 3 4 5

Distance from nearest trail:_____

nearest road:_____

nearest water:_____

Amenities:

(mark “P” for potential)

- Toilets
- Potable water
- Food/pack locker
- Boat rack
- Solar cell phone charging station
- Canopy shelter
- Access to parking
- Power hook-up
- Garbage/recycling receptacles
- South/sun exposure
- Sense of privacy
- Solitude/wilderness experience

(notes:_____)

I. Trail Feature Assessment Forms

Bay to Bay Hiking Trail

Trail Segment Record Form

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc.)	
Location Contact (person):	
Location Phone:	
Location Email:	
Location Website:	

Datasheet:

- ☐ Scenic views
- ☐ Vistas
- ☐ Land cover change
- ☐ Hear traffic
- ☐ See traffic
- ☐ See development

Notes:

Bay to Bay Hiking Trail

Threatened & Endangered Record Form

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson - Jameson	
Location Phone: 231 - 334 - 3130	
Location Email: barbara_nelson - jameson @ nps . gov	
Location Website: www. nps. gov / SLBE	
Notes:	

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson - Jameson	
Location Phone: 231 - 334 - 3130	
Location Email: barbara_nelson - jameson @ nps. gov	
Location Website: www.nps. gov / SLBE	
Notes:	

Bay to Bay Hiking Trail

Vegetation Record Form

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson-Jameson	
Location Phone: 231-334-3130	
Location Email: barbara-nelson-jameson@nps.gov	
Location Website: www.nps.gov/SLBE	
Trail Vegetation: ☐ Wetland ☐ Invasive ☐ Land Cover Change Notes:	

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson-Jameson	
Location Phone: 231-334-3130	
Location Email: barbara_nelson-jameson@nps.gov	
Location Website: www.nps.gov	
Trail Vegetation: ☐ Wetland ☐ Invasive ☐ Land Cover Change Notes	

Bay to Bay Hiking Trail

Slopes Record Form

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson - Jameson	
Location Phone: 231 - 334 - 3130	
Location Email: barbara_nelson_jameson@nps.gov	
Location Website: www.nps.gov/SLBE	
Slopes: Access:	

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson - Jameson	
Location Phone: 231 - 334 - 3130	
Location Email: barbara_nelson-jameson@nps.gov	
Location Website: www.nps.gov/SLBE	
Slopes: Access:	

Bay to Bay Hiking Trail

Archeology Record Form

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson - Jameson	
Location Phone: 231 - 334 - 3130	
Location Email: barbara_nelson_jameson@nps.gov	
Location Website: www.nps.gov/SLBE	
Notes (historic sites, etc.):	

Location Name:	
Address or Community:	
Latitude:	**Longitude:**
Miles from Last Access:	Miles from Start:
Site Ownership: (City, county, state, etc)	
Location Contact (person): Barbara Nelson - Jameson	
Location Phone: 231 - 334 - 3130	
Location Email: barbara_nelson-jameson@nps.gov	
Location Website: www.nps.gov/SLBE	
Notes (historic sites, etc.):	

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