

Bates-Morse Mountain Conservation Area



Annual Report, 2020-2021

Prepared by Caitlin Cleaver, Director

May 2021



Photo credit: Caitlin Cleaver

Contents

- 2 Letter from the Director
- 3 Research & Monitoring
- 6 Conservation & Wildlife
- 7 Education & Public Visitation
- 9 Looking Forward & Updates
- 10 Appendix
 - 2020 Report to The Town of Phippsburg

Letter from the Director

I continue to reflect on lessons learned during the tumultuous year of 2020. There was so much hardship, but also resilience.

At Bates-Morse Mountain, we had to adjust plans as new information came out about the virus and transmission risks. We closed to the public in April and May, but then reopened in June with fewer parking spots to allow for physical distancing between vehicles. Public visitation was up slightly since 2019. It was clear people were deeply appreciative for the opportunity to explore the natural beauty of Bates-Morse Mountain. During lockdown, time seemed to slow down, but so much work was still moving forward – rather than in-person meetings, people turned to Zoom and other online, virtual platforms.

One impressive accomplishment of 2020 was the completion of the Maine Climate Council’s “Maine Won’t Wait: A Four-Year Plan for Climate Action,” in which, the importance of blue carbon in mitigating climate change was acknowledged. Blue carbon is the carbon uptake of coastal systems, such as salt marshes, and the oceans. One recommendation focused explicitly on developing an inventory of the state’s blue carbon potential. Bates professor, Bev Johnson’s research explores blue carbon dynamics at the Sprague Marsh as well as at other marshes throughout the state and her expertise was integral to the Council’s work. The focus on blue carbon is an explicit reminder that places like BMMCA are critically important in the fight to combat climate change and that research helps us understand their contributions.

Students did an incredible job of continuing to move forward with their studies and figured out ways to conduct research at BMMCA throughout the year to complete theses and class projects. I believe BMMCA was likely a welcome respite for these students, giving them a chance to get outside and off-campus.

We had reports from regulars that the plovers arrived in early March and reports from the Maine Audubon team is that it will be an active season. It’s exciting to see the plover population continue to stabilize thanks to the efforts of various groups. I am grateful that spring is here and that we will have the chance to more easily be outdoors. Looking forward to seeing you at Bates-Morse Mountain!

Sincerely,

Caitlin



Photo credit: Theophil Syslo/Bates College

Research and Monitoring

■ Salt marshes: Annual monitoring of the Sediment Elevation Tables (SETs) was completed in August by Bev Johnson, professor in the Department of Earth and Climate Sciences, Phil Dostie, a lab technician and students. Johnson also advised Summer Dias, '21, for her thesis. Dias found that the Sprague Marsh is highly susceptible to sea level rise, particularly in the southern portion where accretion of sediments does not appear to be keeping up with annual sea level rise estimates. Salt marsh vegetation transects were not completed in August 2020, but will be conducted in 2021. Time series data for the salt marsh vegetation transects are archived on Google Drive. Johnson holds the time series data from the SETs.

2020 – 2021 BMMCA STUDENT RESEARCH

- Cole Fuller, '21, "The Effect of Saltwater Intrusion on *Pinus rigida* Stands at the Bates Morse Mountain Conservation Area," Advisor: Brett Huggett, Biology
- Emma Proietti, '21, "Coastal Forest Response to Past Floods and Storm Surges in the Gulf of Maine," Advisor: Brett Huggett, Biology
- Alex Bickart, '21, worked to link lichen populations to alterations in soil chemistry, Advisor: Brett Huggett, Biology
- Summer Dias, '21, "Impacts of Sea-Level Rise, Accretion, and Subsidence on Recent Changes in Elevation of the Sprague Marsh in Phippsburg, Maine," Advisor: Bev Johnson, Earth & Climate Sciences
- Jacob Russett, '21, "Monitoring Beach Retreat and Sediment Shift at Seawall Beach, Phippsburg, ME," Advisor: Mike Retelle, Earth & Climate Sciences
- Lily Nygren, '21, "Examining intertidal community structure and species distribution on the coast of Maine," Advisor: Katie Dobkowski, Biology
- Dylan Simon, '21, "Seas Are Rising: Assessing Coastal Vulnerabilities in Phippsburg, Maine," Advisor: Francis Eanes, Environmental Studies



Photo credit: Bev Johnson. Using the tripod, on the causeway, and auto-level to measure the stadia rod measurements for SET 4 on 08/27/2020.



Photo credit: Bev Johnson. Measuring the pin heights for SET 4 using the sediment elevation table on 08/27/2020.

■ Beaches: Beach profiles were completed in 2020 by Jacob Russett, '21 and Summer Dias, '21, under the supervision of professor, Mike Retelle. The data have been compiled and discussions are underway for developing a permanent archive for the extensive beach profile dataset from Seawall Beach and the pocket beaches on Cape Small. Russett also completed his thesis working with Retelle.



Photo credit: Caitlin Cleaver

■ Coastal Forests: Brett Huggett, a professor in the Bates Biology Department has been doing research related to fungal endophytes in Pitch Pines at BMMCA since June 2019. In addition, he advised three students who conducted field work related to their thesis projects at BMMCA this past year. One of his students, Emma Proietti, '21, worked "...to understand how climate change, particularly rising sea levels and increased storm intensity, will affect coastal forests in Maine, this thesis project examined the effects of past precipitation on four tree species in the forest just behind Seawall beach. Tree cores were taken from red oak, red maple, paper birch, and pitch pines, and the width of the rings will be correlated with weather data from a nearby weather station to see how much the sampled trees grew in years where there was a lot of precipitation. Understanding how these trees responded to years with intense rainy seasons or storms may help to inform

conservation strategies or to anticipate changes in the landscape at BMMCA with future changes in the climate."



Photo credit: Caitlin Cleaver

■ NeCSA (Northeastern Coastal Stations Alliance) update:

Nearshore Temperature Record: Temperature loggers deployed in August 2019, remained in the field through 2020 and will be collected so data can be downloaded in August 2021. This monitoring is in coordination with other NeCSA stations. Data will be archived on Google Drive in the NeCSA file and shared with H. Webber, the Marine Ecology Director at Schoodic Institute who collates data from member stations.

Network Activities: Governance documents were finalized at a May 2020 meeting and have been adopted by network members. Officers and sub-committee chairs will be determined in summer 2021 with the goal of hosting an annual meeting in October 2021.

- **Rocky Intertidal Community Monitoring:** Katie Dobkowski, visiting assistant professor of marine biology and her students continue to build on data collected from 2019 and conducted the NeCSA protocols to characterize the intertidal communities at two sites on Hermit Island in Phippsburg and at two sites in Harpswell. Lily Nygren, '21, completed her thesis.
- **Southern Pine Beetle monitoring:** In partnership with The Nature Conservancy and the Maine Forest Service, BMMCA staff (Don Bruce) started 2021 monitoring for the Southern Pine Beetle (SPB) in early May. Results from 2020 data showed no signs of SPB, which is a pest for pines throughout the southern US. SPB is expected to expand its range northward with warming temperatures, but it has not yet been found in Midcoast Maine.
- **Basin Oyster Project (BOP):** BMMCA Director and Bates students will be working in partnership with the Phippsburg Conservation Commission, the Maine Oyster Company, Manomet, and others to determine the potential for the Basin to sustain an oyster reef. Protocols are under development and baseline data will be collected in summer 2021.
- **Phippsburg Comprehensive Plan:** Francis Eanes, a professor in the Program in Environmental Studies at Bates and his students provided research support Phippsburg's revision of its comprehensive plan with a specific focus on affordable housing and climate adaptation strategies. Dylan Simon, '21, completed her thesis.
- **BMMCA Research on-line:** The interactive map of BMMCA research is now live on the BMMCA website: <https://www.bates.edu/bates-morse-mountain-shortridge/research/>. Created in 2018 by Isobel Curtis, '17, the map includes point locations of different projects. This map will be updated by Bates students in summer 2021.



Photo credit: Caitlin Cleaver

Conservation and Wildlife

Migratory Shorebirds on Seawall Beach

■ Seawall Beach provides critical habitat to migratory shorebirds, many of which are protected under federal and state legislation. The federally threatened and state endangered Piping Plover is Seawall's most notable rare bird. A small colony of the endangered Least Tern appeared late in the season on Seawall in 2020. Historically, tens of thousands of birds have used the beach during each fall migration (mid-July through early September); however, shorebird populations are in decline due to anthropogenic effects such as habitat loss and human disturbance. These threats are magnified by climate change. Despite grim trends, numbers of nesting pairs for the Piping Plovers in Maine indicate that the population has stabilized and is now growing with the efforts of Maine Audubon and their partners. All data reported below has been compiled by Maine Audubon in their annual report.

Least Terns:

- **Statewide:** A minimum of 258 pairs were recorded with 130 nesting at Crescent Surf with a minimum of 65 fledglings and 128 nests at Higgins Beach in Scarborough with at least 50 fledglings. State productivity for the 2020 season was considered fair and estimated at 0.45 fledglings per pair of Least Terns.
- **Seawall:** In 2020, there was courting activity observed and a small colony formed on the Morse River side of Seawall Beach with seven nests and one chick successfully fledged. The last recorded nesting attempt was in 2016, but Least Terns have not successfully nested on Seawall since 2005 when there was a 17-nest colony which succumbed to fox and coyote predation. No predator management has been implemented at Seawall.

■ **Popham:** In 2020, there were no nesting attempts. In 2016, 22 nests were active; however, all hatchlings succumbed to predation. In 2015, 40 nesting attempts resulted in 4 fledglings. In 2013, three nesting attempts occurred, but no fledglings and in 2012, two nesting pairs produced 3 fledglings. Prior to 2012, no terns had attempted to nest on Popham since 1997 when 15-pair colony resulted in no fledglings. No predator management has been implemented.

Piping Plovers:

- **Statewide:** In 2020, 199 piping plover chicks fledged from 23 Maine beaches topping a 2019 record number of fledglings since monitoring began in 1981. The number of nesting pairs increased 10% from 2019, from 89 to 98 pairs. The year ended with several high record numbers including: the largest number of nesting pairs on one beach with 14 at Popham, the largest number of chicks fledged from one beach with 30 from Ogunquit, and the first time there were more than 20 fledglings from each of four beaches, including Seawall.
- **Seawall Beach:** Twenty-three fledged from Seawall successfully hatching from seven nests. Seawall hosted eight pairs of Plovers which attempted to nest 12 times. Two nests were predated, one of which had an enclosure the predator successfully navigated (likely a weasel). Two additional nests were lost due to unknown circumstances and one was abandoned. Field crews noted a high number of crows on the Sprague River side of the beach which likely influenced nest locations.
- **Popham Beach:** 14 pairs of Piping Plovers attempted to nest 14 times. A total of four nests did not hatch, three being abandoned and one predated. A total of 25 chicks successfully fledged.

Education & Public Visitation

Educational Activities

■ BMMCA continues to be an accessible destination for elementary schools through college and university groups for a wide variety of activity from team building and leadership development to studying field research methods. However, school visits were much lower this past year likely due to the pandemic. In addition, few schools notify the director in advance of a field trip and, as a result, the numbers reported here likely underestimate educational use of BMMCA. A total of 200 participants visited BMMCA for educational purposes in 2020 including a Bates College course taught by Bev Johnson with a total of 41 students. The Coastal Center at Shortridge remained closed from March 2020 through May 2021.

“In September of 2020, Mike Retelle, a Bates professor, explained the topography of Morse Mt. to a group of 25 seniors from the Walking Club of OLLI at USM in Portland. He told us about his experiments with sediment transport and explained how wave action has reshaped the dunes. We learned how climate change has impacted the marsh and were impressed with the research initiatives which are occurring at this area. All of us were very interested in the way Mike involves his students in his research and were very grateful to have had the opportunity to visit Morse Mt.”

- Rae Garcelon, '62, Coordinator of the Walking Club

2020 GROUP VISITS TO BMMCA

- Bowdoin Outing Club (20),
- Brunswick Boy Scouts (13),
- Chewonki Foundation Environmental Education (54),
- Hyde School Outing Club (8),
- Lewiston/ Auburn Senior College (15),
- RSU5 Durham/ Freeport/ Pownal Teen Treks (8),
- Waldorf School Freeport (16), and,
- The Walking Club of OLLI at USM (25).



Photo credit: Rae Garcelon. Professor Mike Retelle teaching Walking Club participants about sediment dynamics on Seawall Beach.

ANNUAL TOTALS			
Year	Visits	Gatekeeping Days	Per Day Average
2010	16,182	168	96
2011	16,361	174	94
2012	17,286	190	91
2013	18,802	181	104
2014	19,147	171	112
2015	21,390	182	118
2016	22,691	187	122
2017	22,507	173	130
2018	20,657	166	124
2019	21,321	174	123
2020	22,898	179	128

Public Visitation:

■ These data were collected over 179 gatekeeping days from January 1 through December 31, 2020. Due to

the coronavirus pandemic, BMMCA was closed to the public from March 28th until June 1st. Upon reopening, parking spots were spaced out to allow for physical distancing between vehicles. This reduced the number of parking spots from a total of 33 to 27. Our gatekeepers observed that fewer people seemed to be carpooling and that on days the parking lot filled, they were turning away more vehicles. Overall, we believe that the pandemic did increase the number of people visiting or attempting to visit BMMCA and that the changes we made to parking lot management led to the lot filling on more days during the gatekeeping season.

■ Overall, 22,898 people visited Bates-Morse Mountain in 2020 with approximately 17% coming for the first time. The parking lot filled on 122 days out of 179 gatekeeping days or 68% of the time (compared to 37% in 2019 and 29% in 2018).



Photo credit: Caitlin Cleaver

Looking Forward

Bates-Morse Mountain Conservation Area

Maine Audubon teams have already started monitoring this year's shorebirds and the season is shaping up to be an active one. This summer, two Bates students will support ongoing monitoring and research while also interacting with visitors in the parking lot. We will also reopen the Shotridge Coastal Center for faculty retreats and other groups with capacity limits in place to abide by public health guidance. In the fall, we hope to be able to host a volunteer beach cleanup. Looking ahead, we are planning to pursue funding to potentially begin a long-term salt marsh restoration project which will be a collaboration of multiple departments at Bates, involving students and community partners.

Updates:

- **The beach cleanup** was carried out by three volunteers, Bates staff and a BMMCA board member in April of 2020 and May of 2021. Over 100 lobster traps were collected from the beach. We will plan to do another beach cleanup in the fall.
- **Bates College Reunion** was a virtual event in 2020 and we provided a slideshow of photographs from BMMCA.
- **The parking lot website** was rolled out in 2020 to inform visitors about when the parking lot has filled for the day. We update it as regularly as we can and believe this can be a tool to help visitors plan their trips (bmm parking.com).
- **Bates course on coastal issues:** Caitlin Cleaver, Director of BMMCA, taught her first course at Bates during the winter semester in Module D, entitled Managing the Gulf of Maine: Climate Change and the Impact on Coastal Communities. Students heard from

a variety of speakers and learned about fisheries, aquaculture, offshore wind energy, rising sea levels and community adaption and coastal conservation and blue carbon.



Photo credit: Caitlin Cleaver. Traps recovered during the May 2021 beach cleanup.



Photo credit: Caitlin Cleaver. Jim Joseph, Shotridge Caretaker and Jeff Sturgis, '69, BMMCA board member help clear traps from the beach.

Appendix: 2020 Report to the Town of Phippsburg

2020 Report to the Town of Phippsburg



Photo credit: Caitlin Cleaver

A Note from the Director

As I'm sure it was for all of us, 2020 proved to be a challenging year. We closed the Bates-Morse Mountain Conservation Area (BMMCA) to the public for April and May while we figured out how to safely recreate outdoors with the rapidly spreading pandemic. We reopened the area in June. Throughout the summer and fall, people expressed their gratitude for access to such a beautiful area and their appreciation was a good reminder of how fortunate we are. In addition, the state's Climate Council finished a report of recommendations to address climate change and mitigate its impacts. The report highlighted the importance of marshes in storing carbon and the need to protect

these areas. BMMCA is a good example of marsh protection, but we likely need to understand if additional action should be taken to ensure marsh health and integrity. The report also emphasized the value of long-term monitoring to determine baselines against which to measure change – again, I was reminded about BMMCA's importance in supporting ongoing research and monitoring efforts. In closing, I also recognize that BMMCA is within an incredible community that welcomes visitors to take in and enjoy the beauty of our coast and for that, I am appreciative of the Phippsburg community.

– Caitlin Cleaver, Director, Bates-Morse Mountain Conservation Area

Summary of Visitation and Education & Research Activities

The total number of visitors in 2020 was higher than in previous years despite having a reduced number of parking spots in the lot to allow for physical distancing between cars (Table 1). The Conservation Area was closed in April and May and reopened to the public in June. During the summer and fall, we saw increased levels of visitation. We believe this increase is related to a number of factors, including more people getting outdoors due to the pandemic, reduced parking capacity at Popham Beach State Park, and relatively mild weather throughout the year.

Annual Totals:	2017	2018	2019	2020*
Total visitors	22,507	20,657	21,321	22,331
Total gate-keeping days	173	166	173	179
Avg. visitors per day	130	124	123	128

Table 1. Visitor totals for March through November in 2017, 2018, and 2019 and for January through December in 2020 (Note: the area was closed to the public in April and May 2020).

A number of different groups continue to access the area for educational and recreational activities, but the total number of groups visiting in 2020 was lower than in 2019 likely due to the pandemic. Groups included a total of 175 participants from one Bates course, three high school and college outing clubs, a Boy Scout troop, environmental education and a senior college group.

Research and monitoring continued - Maine Audubon conducted weekly plover surveys throughout the summer. Five Bates students started their thesis research in the area in the summer and fall and four of those students are continuing their work this spring. Their studies range from understanding carbon capture in the marsh to climate change impacts on pitch pine to changes in beach sediment distribution. Two Bates students utilized data from the Northeastern Coastal Stations Alliance (NeCSA), a network of coastal field stations of which Bates is a member. Finally, one Bates senior did thesis research to support Phippsburg's comprehensive planning process.

"In September of 2020, Mike Retelle, a Bates professor, explained the topography of Morse Mt. to a group of 25 seniors from the Walking Club of OLLI at USM in Portland. He told us about his experiments with sediment transport and explained how wave action has reshaped the dunes. We learned how climate change has impacted the marsh and were impressed with the research initiatives which are occurring at this area. All of us were very interested in the way Mike involves his students in his research and were very grateful to have had the opportunity to visit Morse Mt."

- Rae Garcelon, Coordinator of the Walking Club



Photo credit: Rae Garcelon, '62

Other Updates

We use the parking lot as a tool to manage public use of the area. Cars that arrive after the lot has filled are turned away. The gatekeepers allow in additional cars in if spaces open at their discretion. In 2020, the gatekeepers noticed a dramatic increase in the number of vehicles that needed to be turned away, posing a safety risk on Rt. 216. Given that, we are hoping to take steps to reduce the number of cars arriving after the lot has filled. We piloted the use of a webpage where we update the status of the parking lot to notify visitors that the lot has filled (bmmparking.com). We are still perfecting the system, but we do plan to continue using this tool throughout the gatekeeping season. We also plan to collect visitor emails in 2021 so we can communicate more readily with people who recreate in the area.

As always, we would like to thank the Phippsburg Police, Fire Department and Emergency Response personnel for their continued support and timely assistance with issues that arise any time, day or night. We deeply appreciate knowing that the area and its visitors are always in good hands when we cannot be on site.

Looking Ahead

The annual beach cleanup will take place in April 2021 and given the number of traps and gear that wash up each fall, we will schedule a fall cleanup date as well.

This summer, we are hoping to host a team of researchers from the University of New Hampshire who study shorebirds as well as two Bates students who will conduct monitoring and research projects in the area as well as help manage the parking lot.

Please plan to check our website for the full annual report. It will likely be posted by mid-June 2021. (www.bates.edu/bates-morse-mountain-shortridge/photos-annual-reports/)



Photo credit: Caitlin Cleaver. Don Bruce, BMMCA Lead Gatekeeper, collecting samples from the Southern Pine Beetle trap.

Bates-Morse Mountain Conservation Area

7 Andrews Lane
Lewiston, Maine 04240



Photo credit: Caitlin Cleaver