SUSTAINABILITY LEADERSHIP:

MY LEARNING JOURNEY

by

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Submitted to the Program of Organizational Dynamics,
College of Liberal and Professional Studies
in the School of Arts and Sciences
in Partial Fulfillment of the Requirements for the Degree of
Master of Science in Organizational Dynamics at the
University of Pennsylvania

Philadelphia, Pennsylvania

2020

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ABSTRACT

Global sustainability is an essential challenge in our world and for our future, a cause that I am committed to in my personal and professional life. The Organizational Dynamics program has increased my focus and engagement and has resulted in increased awareness in myself personally and those around me, as well as positive behavior change. I review the Sustainability Development courses that I took, then delve more deeply into the two that have affected me most deeply and show how that has translated into action in my own life, both personally and professionally. I examine organizations in New Hampshire that balance the tourism necessary for their success, with preserving the nature which drew the tourists in the first place; I also assess how the surviving grand hotels have embraced sustainability measures in the modern era. I have studied the Earth's dwindling water supply and seen how some of the world's largest cities have dealt with a water crisis. After experiencing a water crisis in my own home, I evaluated the response, applied Richter's principles for sustainable water management, and have seen behaviors and habits change as a result. In my personal and professional life, I have taken on leadership roles and have seen evidence of change. I am encouraged by these results and am motivated to drive further change in the future.

ACKNOWLEDGEMENTS

I would like to thank the faculty members of the Organizational Dynamics program for their support. I am grateful to Dr. Alan Barstow for his leadership and guidance throughout my entire graduate career, whether in class, hiking up mountains, or Zooming (even before COVID-19). Special thanks to Steven Finn for his expertise and friendly assistance, both in and out of the classroom. And I am especially grateful to Dr. Syd Havely for introducing me to the White Mountains of New Hampshire, a.k.a. This Grand and Magnificent Place. Thanks for getting me back on the trail.

Most importantly, I am indebted to my husband Keith for his constant loving encouragement, and for the gift of time. And always grateful for my children, who challenge me every day to be and do my best, and motivate me to drive change for the future - which belongs to them.

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CHAPTER ONE

INTRODUCTION

Global sustainability is an essential challenge in our world and for our future. I am deeply committed to help shape that future. My commitment to sustainability is the underlying philosophy for how I live my life, and through example, teach my four children to do the same. While in the Organizational Dynamics program, I have taken classes on this subject across the MSOD curriculum to consider how best to advance this mission in my own life. This effort forms a critical part of my commitment to address environmental challenges. I now understand Sustainability Development issues at a higher level than ever before, and this resulting awareness and focus has enabled me to become more actively engaged in these vital issues, and to make meaningful actions toward positive change. While there was already a significant amount of activity, it has become more focused and action-oriented than ever before.

I will share how the program provided this opportunity and in what ways I learned and grew from it. I will explore the Sustainability Development courses that affected me most deeply, and how that has translated into action in my personal life and in my professional life.

Sustainability has always been a presence in my life: during childhood, as a young adult, as I raised my own family, and in my work throughout my career. I was raised from childhood to consider how my actions affected the world around me. It became

more important and intentional over time, and then blossomed (and expanded to my professional life as well) in large part due to MSOD program.

When I graduate from the Organizational Dynamics program, I will receive a Graduate Certificate in Sustainable Development (SD) in addition to the master's degree. I will have taken six course units in this area, thereby developing specific expertise and signifying mastery of the topic. These courses have allowed me to explore the theory, application, and critical perspectives of this subject area.

The Sustainable Development concentration concerns the ability of an organization to meet their present needs and interests without compromising the ability of future generations to do the same. (2019-20 MSOD and MPhil Student Handbook) How an organization builds and supports a culture that systemically integrates meeting the triple-bottom-line (people/social, profit/economic and planet/environment) is central to this concentration. Perhaps the greatest challenge in creating a sustainable culture is changing the engrained patterns of behavior and practice of an organization's members and stakeholders.

This program, and specifically the concentration in Sustainability, has resulted in me having an increased focus on the subject, tangible results in my workplace, and a reputation as a subject matter expert at my place of work. As *Director of Finance* at the Penn Museum (at the University of Pennsylvania) while working towards the MSOD degree, I have helped bring about meaningful change during my tenure.

Sustainability, sometimes simply defined as not harming the environment or depleting natural resources, is a complex topic and can have different meanings in different settings and situations. In the context of this paper, sustainable development is the organizing principle for meeting development goals while at the same time allowing natural systems to provide the natural resources and ecological services which the economy and society depends on. The desired result is a state of society where living conditions and resources are used to continue to meet human needs without undermining the integrity and stability of the natural system. Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. as not harming the environment or depleting natural resources. (Brundtland, 1987)

In chapter two, I look at literature in the field. Chapter three examines the SD courses that I took during the Organizational Dynamics program, and their context within my educational experience. In chapters four and five, I discuss in depth the classes which had the most significant effect on my growing awareness and shifting of mindset frames. Chapter six shows how these learnings have impacted my life, both personally and professionally, and where I have maximized my impact by inspiring others to action and driving behavior change. I want to share these stories with you, the reader, so you, too, can consider the journey from awareness to active leadership in this field. Chapter seven wraps up with concluding thoughts.

CHAPTER TWO

LITERATURE REVIEW

This chapter will review the relevant literature regarding sustainable development. In the 1970's, the term sustainability began to be widely used from an environmental point of view and was primarily related to environmental issues. Growing concern about global environmental problems and skepticism about reducing industrial pollution pushed the UN to address these problems in 1972 in Stockholm, at the UN Conference on Human Environment. The conference led to the development of 26 principles which addressed environmental concerns, the creation of the UN Environmental Programme (UNEP), and the creation of several environmental protection agencies. (Nations, 1973) The World Conservation Strategy (WCS), created in 1980, referred to 'development that is sustainable' in terms of both improvements in human life and conservation of natural resources. In 1987, the final report of the World Commission on Environment and Development (WCED), titled Our Common Future, provided an overview on the state of the environment, as well as the most popular definition of Sustainable Development, used in the context of this paper: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland, 1987) The UN Conference on Environment and Development (UNCED) in 1992, referred to as the Rio Earth Summit, produced a global action plan for sustainable development. The resulting report (called Agenda 21, or the Rio Declaration) provided

recommendations for the achievement of sustainable development, by putting major emphasis on environmental items. (United Nations, 1992) In 1997, the Kyoto Protocol to the UN Framework Convention on Climate Change (UNFCCC) (known simply as the Kyoto Protocol) showed how little progress had been made against these goals and set amended goals. (UNFCCC, 1997)

Since the turn of the century, new types of goals have emerged, such as the LEED green building rating system, and the UN Millennium Goals. The LEED (leadership in energy and environmental design) green building rating system rates "greenness" of buildings (existing, or new construction), structures including homes or schools, or even neighborhoods. The 2000 United Nations Millennium Summit led to 8 major goals, intended to be achieved by 2015. These goals are:

1. Eradicating extreme poverty and hunger
2. Achieving universal primary education
3. Promoting gender equality and empowering women
4. Reducing child mortality rates
5. Improving maternal health
6. Combating HIV/AIDS, malaria, and other diseases
7. Ensuring environmental sustainability
8. Developing a global partnership for development

In 2015, the United Nations General Assembly set 17 Sustainable Development Goals (SDGs) which are a collection of 17 interlinked goals designed to be a "blueprint to achieve a better and more sustainable future for all."

The 17 SDGs are:

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation,
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reducing Inequality
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice, and Strong Institutions
17. Partnership for the Goals

These broad and interdependent SDGs have specific targets for each goal (or sub goals within each category) and are intended to be achieved by the year 2030.

CHAPTER THREE

EXPLORATION VIA COURSES

In this chapter, I take you on the sustainability journey of my MSOD program experience. More specifically, the Sustainability Development courses that I took during the Organizational Dynamics program are identified to show the context within my educational experience. I then identify the two classes which had the most significant effect on my growing awareness and shifting of mindset frames, and how that translated to behavior change and action in my personal and professional life. In later chapters, I discuss these two classes in depth.

I begin with an inventory of the six sustainability courses I took during the program. In the fall of 2013, I began my graduate studies in the University of Pennsylvania's Organizational Dynamics program, and the following spring took my first SD course: DYNM501 Perspectives on Organizational Dynamics. In 2016 I took DYNM617 Economics of Human Life, and in 2017 DYNM650 Outdoor Dynamics: Issues in Sustaining Wilderness and Backcountry Areas. In 2018 I took a Global PENNovation course DYNM615 Water Security in a Changing World. This was followed in 2019 by DYNM654 Crisis Communications and Reputation Risk, and finally in 2020 DYNM658 Fundamentals of Sustainability.

YEAR	COURSE #	SHORT TITLE	CATEGORY
2014	DYNM501	Perspectives	F
2016	DYNM617	Economics	F
2017	DYNM650	Wilderness	A
2018	DYNM615	Water	A
2019	DYNM654	Crisis	DE
2020	DYNM658	Fundamentals	A

Table 1 Sustainable Development courses in my MSOD program

In the MSOD program, there are three core curriculum categories: Foundations (F), Applications (A), and Diagnosis & Evaluations (DE). Foundations courses gave me the common language upon which to build my studies and knowledge and prepared me for the deeper immersion in topics later. The one required Diagnosis and Evaluation course concerns the methods for the measurement, diagnosis, analysis, synthesis and/or evaluation of organizations and their activities. This type of course provides multiple approaches to diagnosing complex issues within one's own organization as well as the tools and frameworks needed to respond to these difficult issues. And applications courses gave me the opportunity to further explore the issues and topics found in the Foundations and Diagnosis and Evaluation courses. They provide a closer look at the elements important to any organization.

My six SD courses were not limited to one category but include all elements of the program. Two were Foundations courses, on which everything else builds. Three were Applications courses, which delve more deeply into certain subjects. And the DE course I took (of the 12 available) is one of only two with an SD element.

Of the six SD courses that I completed, the two courses that had the most impact on my life were DYNM650 Outdoor Dynamics: Issues in Sustaining Wilderness, and DYNM615 Global Pennovation: Water Security in a Changing World. One was a travel class, and the other an independent study. Both were immersive and deeply engaging, and they continue to have an impact on my daily life. I will explore these classes to discern the SD elements, a-ha moments, and key takeaways.

CHAPTER FOUR

OUTDOOR DYNAMICS: ISSUES IN SUSTAINING WILDERNESS

In the summer of 2017, I went to New Hampshire for nine days with my classmates in DYNM650 Outdoor Dynamics: Issues in Sustaining Wilderness and emerged from the wilderness a changed person. Hiking through the White Mountains of New Hampshire transformed both my body and my mind, making me physically stronger and providing me with valuable insights into sustainability and a new lens for my life. The White Mountains, only a day's drive for 10 million Americans, include some of the most pristine and exotic micro-environments in the world, left over from the last Ice Age. They are also a unique environment to study the growing interest in promoting sustainable development, which in the context of this course was more narrowly defined as protecting the environment and wild species from human encroachment and pollution. The class became immersed in White Mountains history, meeting many business leaders and environmental advocates along the way. We also experienced many different types of accommodations, which became the sustainability topic that was most compelling to me during the course. First drawn to the 1826 story of the Willey House, I ended up focusing on the grand hotels that have survived and the role that sustainability plays in their operations in the modern era.

Our class experienced a wide variety of sustainability activities and met the key players at several organizations who are tasked with balancing the tourism necessary for

their business to succeed, against preserving the nature which drew the tourists in the first place.

We visited the Barstow Farm, a leader in state-of-the-art farm-powered renewable energy,[1] and a model for 21st century dairy farming where cows are automatically and robotically milked, fed, herded and cared for. This seventh-generation family farm produces its own energy to power the farm and hot water to heat farm buildings and family homes and is committed to sustainable farming practices.

Figure 1 Barstow Farm, Hadley, Massachusetts (photo by K. Forrest, 2017).

We spent a day at Dartmouth College immersed in the history and operations of the stone huts owned and operated by the Appalachian Mountain Club (AMC) – not only

[1]Used to manage waste and produce fuel, the anaerobic digester at the Barstow Farm converts the energy potential in farm and food waste into electricity, heat, and fertilizer.

the oldest hiking club in America, but the oldest conservation group of any kind. (Bryson, 226.) We later learned about AMC's approach to sustainability initiatives from Chris Thayer, AMC Director of North Country Programs and Community Relations at the Highland Center in Crawford Notch. The AMC huts and lodges are models for sustainable operations and environmental stewardship. But they are also designed to illustrate these concepts and provide an opportunity for guests to learn how to practice conservation at home.

We studied Guy Waterman's books about hiking and conservation, from Backwoods Ethics (1979) which was a call to reevaluate the impact of our outdoor recreation on the wilderness, to Wilderness Ethics (1993) which looks beyond preserving the ecology of the backcountry to focus on what they call its spiritual dimension—its fragile, untamed wildness. The consistent message was "the spirit of how people should come to the mountains." Before his death in 2000, Waterman expressed great disappointment in his failure to persuade others to leave the mountains unspoiled.

We visited the New England Ski Museum, where former NH State Geologist Brian Fowler described conservation efforts for the Old Man of the Mountain, the state's beloved natural icon (also known as the Profile or the Great Stone Face) both before and after it collapsed in May 2003. Comprised of a series of granite slabs 40 feet tall and 25 feet wide, the formation looked like a jagged face when viewed from certain angles.

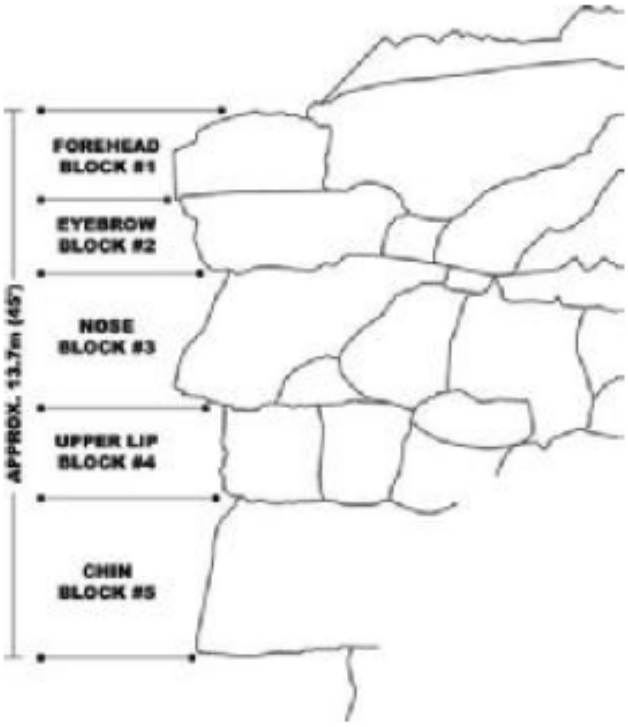

Figure 2 Diagram of Profile's component block combinations.

Dr. Fowler had been involved in preserving and protecting the Old Man since the mid-1970's, and described the geological impacts contributing to its demise. Even though it was a popular tourist destination, its collapse was attributed to the unyielding effects of weather (high winds, heavy rain, and freezing temperatures) over time.

Figure 3 Old Man of the Mountain from Profile Lake, Franconia Notch (photo by B. Fowler, 1976).

At the Mount Washington Observatory, located on the summit of Mount Washington, Peter Crane (Observatory Curator) discussed its changing role from a weather observatory and collector of data, to an environmental research center seeking to stay current with today's sustainability issues. Home of the world's "worst weather," the Observatory conducts climate research, as well as weather and climate education via classroom and distance learning programs. The juxtaposition of gear-laden thru-hikers alongside tourists wearing flip-flops after driving to the summit is jarring, and illustrates the extremes in visitors and how they can arrive at this remote location.

We learned about the Mount Washington Cog Railway[2] which runs a three-mile scenic train ride to the summit of Mount Washington, utilizing solar-powered track switches, and using two historic steam trains (which generate vast amounts of smoke, nicknamed Cog Smog) along with six eco-friendly biodiesel locomotives. The Cog does not have a reputation for being ecologically-minded; rather, they focus on the bottom line. It is notable that we did not meet with anyone from this organization during this trip – though not for lack of trying. They were simply not interested in engaging on this topic with the Penn class.

We met with Howie Wemyss, the General Manager of the Mount Washington Auto Road, who talked with us about "Managing Growth and Sustainability in a Protected Environment" relating to two different areas. He described managing, maintaining, and preserving the Auto Road, the nation's oldest and highest maintained mountain road and oldest man-made tourist attraction in North America. He also discussed in great detail the sustainability initiatives that play a major role in the construction and operations of the Glen House Hotel located at the base of the Auto Road; under construction during our visit, the hotel opened in September 2018.

Our class also experienced a wide variety of accommodations, from a roadside motel, to the Dartmouth Class of '66 Lodge with no electricity and a nearby outhouse; from remote AMC huts with huge bunkrooms for 12-30 people, to the hotel-like Highland Center and Joe Dodge Lodge, which sleeps four to a room. The most unique

[2] The Cog Railway, as it is commonly known, has been operating since 1869.

part of our lodging experience were the rustic AMC huts. On the other end of the lodging spectrum were the magnificent grand hotels.[3] Once prevalent in the White Mountains, grand hotels have mostly disappeared – the three that are still operating today have had to incorporate sustainability measures into their operations in order to survive. Contrary to popular thought, sustainability isn't a cost to organizations, but actually save money, and indeed help ensure survival. I will define grand hotels, describe their decline, and identify the three that are still operating today- and what types of sustainability measures have been implemented in these historic structures.

The tragic story of the Willey family and their inn in the early 1820's made a deep impression on me before and during my travels through the White Mountains, echoing throughout the country and drawing tourists to the White Mountains – helping to usher in the era of grand hotels. The Willeys bought a house, which they expanded and turned into an inn for travelers going through the notch (a valley between two mountains). In August 1826, the Willeys perished after a violent rainstorm caused a massive landslide, destroying everything in its path – but ironically the house everyone ran from was not destroyed or even damaged.[4] In the weeks leading up to the course, I read and re-read the story, which is found in almost every version of White Mountain history. While staying at AMC's Highland Center (located in Crawford Notch, where the Willey house was

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[3]DYNM650 plans to incorporate a visit to a grand hotel for a tour, and to talk with the management team in future years.

[4] The Willey House wasn't touched because a large granite boulder above the house had temporarily divided the slide into two streams, which reunited below the house.

located), I read Nathaniel Hawthorne's fictionalized version of the Willey tragedy, *The Ambitious Guest* (Hawthorne, 1854) which made the ancient tragedy seem even more real. I was in the same place, almost 200 years later – and imagined the house, the violent storm, weary travelers making their way down the notch road, the family rushing to supposed safety, and the people picking through debris days later, looking for their bodies. In the dusk of the summer evening, I looked past my classmates playing corn toss on the lawn, to the mountains rising up in the background, and thought about rains in August (the same month we were there). I ate at the long family-style dining tables at the Highland Center and wondered what travelers experienced when they stayed at the Willey House. I hiked up Mount Lafayette[5] the following day, and the rain started as I made my descent. Relieved that I didn't hear thunder until I was back below treeline, my mind went to the Willeys and the rains they experienced - the terror they must have felt when they heard the rumbling of the thunder, or perhaps the rumbling of the mountain itself, sliding down upon them. I imagined the mountain coming down on me, debris sliding down the path as I made my way back to Greenleaf Hut. I arrived safely, grateful to be alive. I felt a kinship with the mountain, with the elements, and with the Willeys (or their ghosts).

During the 1800s, many large resort hotels were built in the White Mountains of New Hampshire and became popular as major summer destinations for affluent city

[5] Second only to nearby Mount Washington in both height and popularity as a hiking destination in the White Mountains. (Bryson, 222.)

dwellers from Boston, New York, and Philadelphia. By the mid-1800's, train service throughout the state enabled more and more visitors to visit, fueling a demand for more rooms and larger hotels. (Johnson, 2006) Out of 200 hotels, inns, and boarding houses in the White Mountains in the 19th and early part of the 20th centuries, only 24 had the opulence to qualify as grand: imposing and dignified, able to accommodate 200-600 in luxurious manner, and providing amenities such as fine dining, ballrooms, riding stables, bowling alleys, swimming, and of course magnificent hiking and scenery (Tolles, 1998) Some had their own train depot, others had on-site farms offering fresh produce, dairy and meat. Some, such as the Mount Washington Hotel, even had their own water-powered printing presses to produce daily menus and newspapers. They introduced several important conveniences and technological advances before they were available in American homes, such as steam heat, gas and electric lights, improved sanitation and water systems, elevators, and box-spring mattresses.

I was married in a grand hotel, on the banks of a river in rural Pennsylvania, in 1996. That beauty burned to the ground in 2017,[6] bringing an end to an era (and a tear to my eye). Sadly, its ending was a fate not uncommon to the New Hampshire grand hotels of old; they were hastily built and made of wood, resulting in so many being destroyed by fire. It was common for these hotels to burn down, only to be rebuilt bigger and grander than ever. And the grand hotels that hadn't fallen victim to fire started to experience

[6] The Riverside Inn was 132 years old and made of wood; 20 fire companies responded to the blaze.

serious financial problems during the Great Depression, when so many people couldn't afford to stay at luxury resorts. Also, the advent of the automobile during the early 20th century allowed tourists to get to more destinations more quickly, shortening hotel visits from an entire season to a weekend or less. Cheaper motels along the developing highways became more and more the norm.

Twenty-four grand hotels once graced the White Mountains; all but three have succumbed to fire and demolition over the years. These few that have survived have done so by successfully adjusting to social, cultural, and economic change, by retaining the flavor and physical trappings of tradition and history, and by taking into consideration the ecological impact of how they operate. They carry on the grand resort hotel standards of excellence and traditions established almost 150 years ago (fine dining, luxurious comfort, unparalleled scenery, vast recreational amenities), and perhaps, most importantly, have brought sustainability to the forefront of how they operate. By embracing sustainability, not only do they save money, but also have an increased marketability to bring in more business. We will examine the types of sustainability measures that have been implemented in the three remaining grand hotels: the Mount Washington Hotel, the Mountain View Grand, and Wentworth By The Sea.

Of the three remaining grand hotels, the once and perhaps still largest wooden structure in New England is the Mount Washington Hotel, which opened in Bretton Woods, NH, in 1902. While mostly built from wood, the skeleton of The Mount Washington Hotel is made of steel, uncommon in its day. Unparalleled in its modern

architecture and amenities, it was widely regarded as the most ambitious and elaborate of the grand hotels. Unlike most of its counterparts, it did not evolve over time, or grow from humble origins as a private residence or small inn. Instead, it was planned and built as a single huge complex, the greatest hotel construction project undertaken in the region until today. It quickly became the centerpiece of the entire White Mountain hotel industry, and a major contributor to the area's economy. In 2009, the hotel underwent a $50 million renovation and the first major addition to the hotel in over 100 years -- a new spa and conference center, which is energy efficient and has a "green roof" in keeping with their goals of sustainability and environmental responsibility. This roof is partially covered with vegetation and soil, planted over a waterproofing membrane which includes additional layers such as a root barrier and drainage. It conserves energy by keeping the underlying building cooler during the summer months, and warmer in the winter. It minimizes storm water run-off by capturing rain for use in irrigation. It also strengthens the integration of the building with the high alpine environment of Mount Washington. The roof uses native plants, intentionally providing a landscape more consistent with views in the White Mountains than a normal garden. It was designed to showcase actual plants that exist as one ascends Mount Washington, through four climate zones, in order to raise visitor awareness of which plants survive under the changing conditions, and the impact that climate has on plant life. The site of the green roof is the highest, coldest, and windiest elevation for a roof landscape in all of New England, so much care was taken to mimic the terrain of nearby mountain elevation. Unique features like cairns were used to

further connect the roof space with trails leading to the summits of the surrounding mountains. In addition, the Mount Washington Hotel purchases sustainable products, from Green Seal-certified cleaning products to organic botanical spa toiletries. The resort is a member of the National Ski Area Association's Sustainable Slopes program and the state Department of Environmental Services' Green Slopes initiative.

The second of the three remaining grand hotels, The Mountain View Grand is the oldest one in New Hampshire. It started out in 1865 as a small inn, and grew to four-storied, twin-towered magnificence over 60 years and eight additions. Located in Whitefield, NH, it remained in the Dodge family until 1979, then changed hands a number of times before closing in 1986. In 2002, after years of extensive restoration and renovation which cost about $20 million, it reopened as the four-season Mountain View Grand Resort & Spa, an elegant dining room, restored ballroom, indoor and outdoor swimming pools and Jacuzzis, golf, indoor and outdoor tennis, and a state-of-the-art equestrian center. Some of their most significant sustainability practices include energy and material consumption, as well as using wind energy to provide 100% of their electricity. Between their on-site 121-foot wind turbine and purchasing Renewable Energy Certificates (RECs) all of their power comes from wind. The Environmental Protection Agency has certified the Mountain View Grand as a 100 percent Green Power Purchaser. It’s the only hotel or resort (and one of only a handful of companies) in New Hampshire that creates or purchases green power for all of their electricity use. The Mountain View Grand has received platinum certification status (the highest level) from

the Green Business Bureau's national green certification program. To reduce energy and material consumption, the hotel has implemented many sustainability measures, such as recycling, towel and linen reuse, composting in the herb and vegetable garden, energy-saving lighting, green meetings (online brochures, bulk instead of individual condiments, non-disposable drink containers, dishware, and cutlery, white boards instead of flip charts, local produce and menu offerings), and soap/shampoo collection and donation to impoverished countries.

The third of the three remaining grand hotels, the Wentworth By The Sea is the only one located along the coast. Built in 1874 in New Castle, NH, it was originally named Wentworth Hall. Over the following 20 years, the hotel quadrupled in size until it stretched 800 feet along the Atlantic Ocean. The hotel had gardens and tennis courts, as well as steam powered elevators, flush toilets, outdoor electric lights, and a private power plant. In 1905, the Wentworth hosted peace talks that ended the Russo-Japanese War and earned President Theodore Roosevelt a Nobel Peace Prize. The Wentworth maintained its international reputation as a premier resort until it closed in 1982, then remained vacant for the next 20 years while pieces of the property were sold off. Used as a haunted setting for the 1999 film *In Dreams*, the Wentworth Hotel reopened in May 2003 after an extensive $30 million restoration which added a new full-service spa and indoor pool, three ballrooms, and a new 170-slip marina. Wentworth By The Sea is a featured member of the Tripadvisor Green Leaders Program, committed to green practices like recycling, local and organic food, and electric car charging stations. The Wentworth is an Energy

Star certified property, with recycling, energy-efficient lighting, low-flow showerheads and toilets, water/energy saving linen program, green meetings (recycled note pads and pens, online menus, paperless billing, pitchers of water instead of plastic bottles), rain gardens & automatic sprinkler systems with moisture sensors, and vegetative buffers to protect water bodies.

The New Hampshire course provided me with a new lens for acting sustainably on a daily basis, When I came out of the mountains, my family picked me up and we stayed in New England for several more weeks. It was a tough transition back to the real world. On the first day, we drove up to the top of Mount Washington where we visited the Observatory, hiked around a bit, and ate lunch. I must have looked horrified when my teenage son took a handful of napkins with his chowder instead of just one – I asked him to give just one to every person, to reduce the waste we produced during lunch (which was already wasteful, served to us in cardboard plates and bowls, and with plastic cutlery). We stayed at a hotel in Conway, which had a mini-golf course attached – resulting in lots of tourists and noise. And wasteful products were everywhere – disposable cups, plastic bags, fresh linens every day. This, after the quiet of nature for over a week, showering only every few days, carrying out our own trash (tea bags! orange peels!). My head was spinning, I was acutely aware of the sheer amount of plastic waste I somehow had never seen before. My kids accused me of being “all nature-y” and my husband assured them I’d be back to my normal self soon. We spent a week in Maine, on the Atlantic Ocean, near the Canadian border, in a small town with not even a traffic

light. It was the best re-entry I could have planned, not realizing beforehand that I'd need it so much. But I never did get "back to normal." I can't drink a cup of tea without wondering why each bag has its own envelope. I had changed. This experience allowed me to see the world with a new lens, and strengthened my resolve for promoting sustainability wherever possible.

CHAPTER FIVE

PENNOVATION: WATER SECURITY IN A CHANGING WORLD

Interested in learning about the most basic of elements, water, I took DYNM615 PENNovation: Water Security in a Changing World in 2018. Low enrollment changed the format of the course to an independent study. Initially disappointed to miss out on the class discussions and expert guest speakers, I soon became immersed in the subject in a way that surprised me. I delved deep into water issues such as the world's dwindling water supply, climate change, and water shortages in major cities around the world. I studied an unfolding water crisis in one of these cities (Cape Town, South Africa) and experienced a personal water crisis when the water pipes froze in my house – and what actions we took as a result. Looking at water conservation and purification through a new lens, I then turned my attention to water systems in Philadelphia and Cape May.

The planet's water resources are under increasing stress due to climate change, poor management, and pollution. As the world's population and demands increase, natural resources become depleted – including water. Water is a valuable, exhaustible resource, and plays a critical role in virtually every segment of the economy - from heavy industry to food production. A prosperous future depends on a secure and reliable water supply. But we are draining our reserves. Our existing supply is stretched to the limit, and the world population continues growing exponentially. In the past when we needed more water, we engineered our way out of the problem by diverting rivers, building dams, or

drilling wells. Today, those options are (for the most part) not viable solutions. Proposals for new dams face immense opposition, many rivers are already dried up or reduced to a trickle, and groundwater tables are plummeting. Changes in weather and dwindling water supplies are two obvious, immediate issues that affect people throughout the world. There are an increased number of droughts, floods, heat waves, enormous storms, and record rainfalls. Communities everywhere are seeing more of what meteorologists call extreme weather events and more variability in climate generally. (Tercek, 2013) Water shortages will increasingly shift public perception of the value of water, prompting governments and companies to view clean water not as a commodity to exploit but as a precious resource. The economic impacts of running out of water can be devastating, and the cost of securing additional water can be very expensive. Water shortages impair the functioning of both grey (man-made) and green (natural) infrastructure systems. The impact to human lives is severe, even deadly. Many poor people living in developing regions of the world cannot readily access clean drinking water, which also affects their ability to grow their own food.

Many of the world's major cities have faced severe water shortages in recent years, including San Paulo (Brazil) in 2014-2016; Cape Town (South Africa) in 2018; and Chennai (India) and Melbourne (Australia) in 2019. The Cape Town water crisis occurred during the semester I took the Pennovation Water Security course. I followed the story closely starting in January 2018, when they predicted that Cape Town would run out of usable water within 90 days. April 21 was "Day Zero," when the municipal

water supply would be shut off. After three years of unprecedented drought, a crisis was at hand, and residents and visitors were subject to strict water restrictions. Starting in February, 13 gallons of water per day was the maximum each person could use – much lower than the 88 gallons of water per day used by the average American, according to the Environmental Protection Agency. (Cassim, 2018) Day Zero would have turned off the municipal water supply for all but essential services like hospitals, and residents would need to stand in line at one of 200 collection points throughout the city (each serving 20,000 people per day, guarded by armed police) for their daily allotment of water. In the meantime, serious conservation efforts were mandated; residents were using less, re-using wherever possible, and stocking up for the future. Government suggestions included the following: check/fix all leaks; two minute showers, or "stop-start" showers (wet your body, turn off the tap, soap up and wash, then turn the water back on to rinse quickly); only flush the toilet when necessary (let the yellow mellow); collect shower, bath, and basin water ("grey" water) then reuse it to flush the toilet. Many residents lined up to collect free spring water, and the news flooded with images of people holding many empty water bottles, in long lines, waiting for water. The idea of having to transport one's own water seemed impossible – something from the days long past, or a remote rural location. How could this be possible in a modern city? In the news were images of a diverse, modern population waiting in line for water, wearing clothes like mine, one man even talking on a cell phone. These were not homeless or poor people; not residents of a village who needed to travel to a well for their daily water, or victims of a natural

disaster. These were women and men, children too, standing on paved streets, with cars going by in the background. I could easily be in this scene, or people I knew or worked with – willing to wait in line to get the most basic, necessary resource known to man. It made me uncomfortable.

Around the same time as Cape Town's water crisis, something happened to my family for the first time during an unusually long stretch of sub-freezing temperatures. After 14 years of living in the same house, the main water line froze, and we were without water.

All six members of my family (me, my husband, and four children) were home that Saturday morning, when I realized that the toilet wouldn't flush. When I tried to wash my hands, nothing came out of the faucet. The heat was on, I was sure of that – even though the air was a bit chilly, if the heat were off it would be significantly colder due to the temperatures that I knew were below zero the night before. I was concerned, but not overly so. I went downstairs to use the other bathroom, when I ran into my husband reading the paper at the dining room table. "The water's not working," he reported glumly. Alarmed, I hurried down to the bathroom in the finished basement. Toilet, no flush; sink, not a drop. I returned upstairs to the last remaining water source, the kitchen sink. Nothing. Yep, he was right, there was no water in the entire house.

It had been colder than this before, but not recently; it had been several years since it had been *this* cold, for so *long*. "There must be a problem with the water supply, or maybe our main," I announced. "I wonder if our neighbors have water. Could be the

whole street." I got dressed and thought about calling the town to see if there was a plumbing issue on our block. I noticed my next-door neighbor getting into her car. I quickly confirmed that she had water, no problem – so it was just our house. Rats. I called my dad, who lives 8 hours away. I described the situation, and he agreed that the main must be frozen – had I left the water dripping overnight, he wondered? Ah, yeah, I remembered that trick- meant to keep the water moving ever so slowly through the pipes so that they would be less likely to freeze. But I hadn't even considered doing that. "Nope," I admitted. He suggested turning up the heat in the house. I called a friend in town who is an engineer, who came right over, space heater in tow. He looked at the water main, which was located between the drywall and the exterior wall of the house – an area with no insulation. It was awfully cold in there. Yep, he said the pipe seemed frozen. He plugged in the space heater, pointed it at the water main, then headed home.

My kids looked stricken. What do you *mean*, they said, there's no water? We're thirsty! We can't *live* without water! Water is life! (They learned that phrase recently at Sunday School, from a woman visiting from Kenya, sharing stories about - and raising money for - WILK Water Is Life Kenya.[7]) I smiled at them, and kindly suggested they drink a glass of juice if they were that thirsty. My oldest knew that I kept a three-day supply of water in a basement closet: 1 gallon per person per day, so 18 gallons of water, stacked in crates. He asked if he could get a gallon of water out, to make everyone feel better. I said sure, this is exactly what it's for. My youngest said no – we should save it,

[7] Singing Water Out of the Ground in Kenya, Joyce Tannian, Ted Talk 2017.

and use it sparingly – isn't it for an emergency, she wondered? Her twin argued that THIS was indeed an emergency! I sighed, retrieved one gallon, and sat everyone down around the dining room table. As we drank our water (some more than others), we talked about what to do if we didn't have water today, or for a few days.

About an hour later, the kitchen sink spurted to life. Crisis averted, we flushed and showered and drank from the tap. My oldest reminded me to pick up a gallon of water, to replace the one we had used. Life returned to normal.

But what if we hadn't gotten water back, what then? What if, like the residents of Cape Town, we had to survive on much smaller rations of water – or if the taps had turned off altogether? I had never considered this scenario before, not really. Sure, I had the foresight to store a few gallons of water in the basement for an emergency, but only enough for drinking (not washing or cooking), and only for a few days. I hadn't ever thought practically about what "having no water" would actually mean. It was a real possibility, and I wasn't prepared. Thanks to this class, and the Cape Town water crisis, I was seeing the world through a different lens, and I wanted to manage the water usage in my own house, better. I thought about Richter's Seven Principles for Sustainable Water Management (Richter, 2014), which provide guidance towards a sustainable water future. In his book Chasing Water (Richter, 2014), these principles are illustrated using the case of the Murray-Darling River Basin in Australia, where implementation of the seven principles resulted in changes in law and practice that buffered the effects of severe drought and set the stage for a more sustainable future. Richter ends on a hopeful note

with examples of individuals, non-governmental organizations and businesses taking the lead and working with governments to reduce water scarcity and restore river health. I decided to apply these principles on a personal level, to my own family, to see what impact could be made, to bring about behavior change.

1	Build a shared vision for your community's water future
2	Set limits on total consumptive use of water
3	Allocate specific volumes to each user, then monitor and enforce
4	Invest in water conservation to its maximum potential
5	Enable trading of water rights or permits
6	If too much water is being consumptively used, subsidize reductions in consumption
7	Learn from mistakes or better ideas, and adjust as you go

Table 2: Richter's Seven Principles for Sustainable Water Management

Principle #1: Build a shared vision for your community's water future. During that brief water emergency, members of my family experienced a range of emotions (such as feeling nervous and uncomfortable, even slightly panicked), but we were not without water long enough for actual physical discomfort. Within days, it was a distant memory. Two months later, we sat down as a group and talked about what had happened, how it made us feel, and how it affected our behavior. Everyone had been at the very least nervous, suddenly without something they had always (always!) taken for granted. We were all sure we didn't want to experience that again. We decided as a group to

identify ways to use less water, and to keep a certain amount of water always on hand. My daughter also wondered if we could save water in the summertime by investing in a rain barrel. I liked that she was thinking outside our immediate situation, and we agreed to check the cost in April at our town's annual Green Festival and decide then.

Principle #2: Set limits on total consumptive use of water. First, we had to measure our consumption based on current behavior (an eye-opening experience), then set limits. For one day, we examined how much water we normally used in the course of a day. We counted flushes, estimated shower times and examined tooth-brushing habits, timed dish-washing and the dishwasher, and tallied up how often we filled our glasses, water bottles, or the dog's water bowl. My oldest son pointed out that none of us drink "enough" water, 8 glasses per day – and that he would find a good app to set goals and track consumption. (An interesting result of this process is that my kids use slightly less water, but drink more!) We measured water used for cooking, and they supervised me washing the dishes. Each process was examined, then altered to impose a limit (don't let the water run while washing dishes, brushing teeth, etc).

Principle #3: Allocate a specific volume to each user, then monitor and enforce. This is what I do best, as a parent: monitor and enforce! This part should be easy (right?). Not really. In the small sample size of my family members, we couldn't assign specific volume per day or per process. Instead, our goal was to decrease the "normal" amount of water usage as measured in step 2. Showers were kept to a specified length. While brushing teeth, the tap was turned off except at the beginning and the end.

Principle #4: Invest in water conservation to its maximum potential. I tasked my 12-year-old to research low-flush toilets: for an initial investment of buying and installing a low-flow toilet, we would reap significant savings in water costs. My MBA kicked in and I explained the concept of ROI, Return on Investment. Together we figured out that it would take less than a year to save the money we'd spent. Plus, we'd be using a lot less water. We also invested in motion-sensor faucets, which turn off automatically. Not only was water being saved, it also resulted in a positive habit of water being turned off more frequently, which carried over to other sinks that were not automatic. This increased awareness was a permanent change in behavior.

Principle #5: Enable trading of water entitlements. Used to taking long showers, none of the kids could imagine two-minute showers (as was recommended in Cape Town). They were even willing to "trade" their drinking water for longer showers (although this was theoretical).

Principle #6: If too much water is being consumptively used, subsidize reductions in consumption. I set a timer for 7-minute showers, but a 5-minute shower earned $1 extra in allowance. This isn't sustainable for my wallet (or presumably for the cleanliness of my teenagers), but it was interesting to see how short the showers became. A few days later, instead of a reward, I instituted a penalty for going over the 7-minute mark - EVERYONE would lose one minute of shower-time the following day. No showers were short, but none went over either. They monitored each other.

Principle #7: Learn from mistakes or better ideas and adjust as you go. I realized that my own investment of time was high – I spent far too much time in the bathroom, monitoring things. They were also monitoring each other, which wasn't very effective due to sibling rivalry and competition.

But overall, it was a useful and enlightening exercise, which resulted in a heightened awareness on everyone's part, and a reduction in water usage. We invested in infrastructure, calculated ROI and water savings, and felt richer already. My oldest said he felt healthier because he was finally drinking "enough" water, and observed that even with drinking more, his was using less water in other ways – which was surprising to him. It was gratifying to see teenagers shift their mindset and make conscious changes in their own behavior!

In early April 2018 Cape Town officials cancelled Day Zero (projected for April 12). The action came after drops in dam levels decreased due to rain, and even more rainfall was expected. Then during the last week of April, a heavy rain warning was issued for the drought-ravaged area. (Saal, 2018). Cape Town's water crisis was over - like my family, residents of Cape Town have been given a reprieve.

In March 2018, I met up with MSOD classmates at the Fairmount Water Works Interpretive Center to learn about the nation's first public water supply system right here in Philadelphia. The Fairmount Water Works opened in 1815 as the sole water pumping station for the City of Philadelphia and operated until 1909 when the city moved to sand

filtration for purification. Over 200 years later, the site is a National Historic Landmark, operating as a research center, and an interpretive center for water education. We learned about the urban water use cycle of river, treatment, tap water, flush, wastewater treatment, and return to the river. One of the goals of the Fairmount Water Works is to instill an appreciation for the connections between daily life and the natural environment. The original water infrastructure in Philadelphia used wooden water mains in the early 1800's as the water collection and distribution system, pumping water from the Schuylkill River to a conduit that delivered water to the center of the city. These wooden pipes were replaced by cast-iron pipes in 1858, but not all were removed.[8] In the Penn Museum's Middle East Gallery, there is a display comparing ancient terracotta water pipes to the ones used today in Philadelphia.

[8] In May 2017, workers replacing a water line along the 900 block of Spruce Street encountered what appeared to be buried tree trunks, later identified as 200-year old water mains.

Figure 4 Middle East Galleries, Penn Museum (photo by K. Forrest. 2019)

In August 2018, I spent a week in Cape May, and during this time I dedicated the better part of a day to understanding local water systems. I wanted to know where the island (which is surrounded by salt water) got their drinking water, where was it stored, how was it distributed. Even at the height of the summer tourist season, there are no water restrictions. My family spends entire days at the beach and in the ocean, and eventually comes home thirsty and crusted with salt and sand. Every day, all six of us shower, using remarkable quantities of fresh, clean water. This, times a thousand, is the volume on a typical summer day in Cape May, thanks to all the shoobies.[9] Cape May has

[9] Tourists (daytrippers, or summer-only residents) are called “shoobies” by the locals, and by my husband who grew up in Cape May. Derives from daytrippers taking the train to

a year-round population of around 3,000 which swells to 750,000 on an average summer weekend, according to the U.S. Census Bureau and the county's planning department. I wondered where the seemingly endless supply of fresh water comes from, how could there possibly be enough for all those people. I connected with Carl Behrens, the superintendent of the Cape May water and sewer utility and the desalination plant manager and made an appointment to visit the Cape May Water Works. Carl spent several hours showing me around the plant and demonstrating the systems that track and monitor the water.

Since the early 1900's, Cape May drew its water from the Cohansey aquifer,[10] which was sufficient for many years. By the 1960s, wells 1 and 2 had to be abandoned due to salt water intrusion. Wells 3, 4 and 5 had been drilled inland to avoid this, but by the 1980s, wells 3 and 4, too, had been contaminated by salt water. Pumping in wells leaves a cone of depression that gets bigger over time; as this cone increases, the aquifer level lowers below sea level, and salty water encroaches. Cape May has had just one uncontaminated well, and the salt water would penetrate it eventually. Faced with an impending water crisis, they built a desalination plant with two new wells dug into the

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the New Jersey shore, with their ticket price including a boxed lunch packed in a shoe box.

[10] An aquifer is an underground water supply: a body of rock and/or sediment that holds groundwater. Groundwater is precipitation that has infiltrated the soil beyond the surface and collected over many years in empty spaces underground. There are two general types of aquifers: confined and unconfined. Confined aquifers have a layer of impenetrable rock or clay above them, while unconfined aquifers lie below a permeable layer of soil.

800-foot Atlantic City Sands Aquifer, the deepest aquifer in Cape May County. Desalination plants turn brackish water[11] into clean, drinkable water using reverse osmosis. Reverse osmosis is a water treatment process that removes contaminants from water by forcing it through a filter at high speed. Brackish water is forced through a tiny, permeable membrane, and the contaminants are filtered out, leaving clean drinking water.

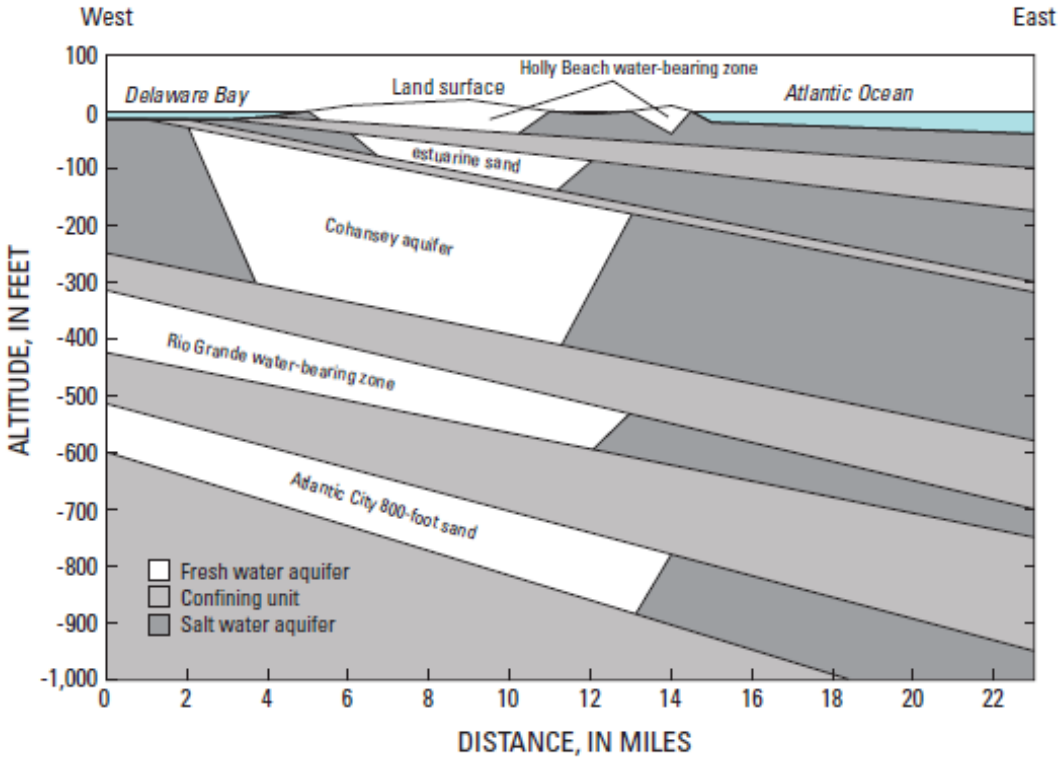

Figure 5 Aquifers and confining units of southern Cape May County, New Jersey.

Housed in the Cape May Water Works, a brick façade built in 1926, the desalination plant is a high-tech system of filters and pipes, as water from the city's wells

[11] Brackish water has more salinity than freshwater, but not as much as seawater.

travels through the reverse osmosis system at 650-gallons per minute. The plant is automated through Supervisory Control and Data Acquisition (SCADA) software, which monitors the process every step of the way. The plant produces 750,000 gallons of water a day in the off-season and 2 million gallons a day in the summer.[12]

Figure 6 Cape May Water Works (photo by K. Forrest, 2018)

[12] This provides enough water not only for year-round residents, but also the ballooning population during the summer tourism season.

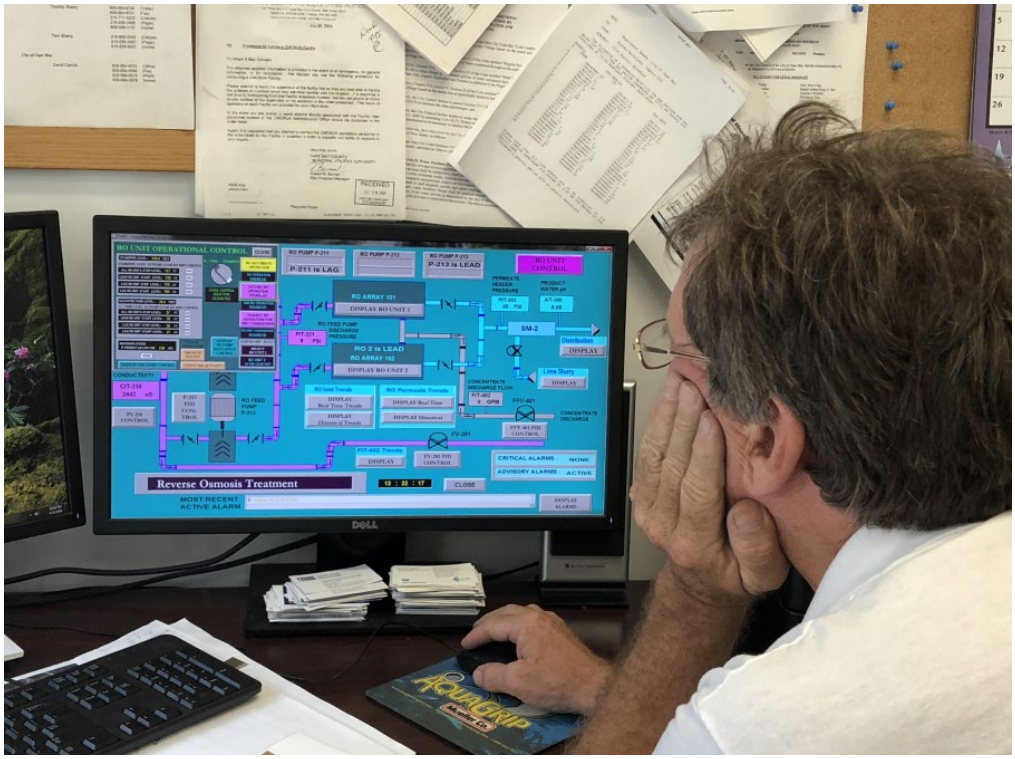

Figure 7 SCADA Reverse Osmosis Software, demonstrated by Carl Behrens (photo by K. Forrest, 2018)

Because of DYNM615 PENNovation: Water Security in a Changing World, I have become engaged in water issues in ways I wouldn't have imagined possible just a few short years ago. I see water conservation and purification through a new lens and have applied it to many different situations. I learned about water crises in major cities around the world and studied the unfolding water crisis in Cape Town as it happened. After personally experiencing a water crisis in my own life, I examined my habits and assumptions about usage and conservation (as well as those of my immediate family) and implemented some lasting changes. I learned about early water systems in Philadelphia,

and recent, high-tech developments in Cape May. One thing is for certain: I no longer take clean water for granted. My awareness and behaviors have changed. Other cities have struggled with “day zero” scenarios similar to Cape Town in 2018: San Paulo, Brazil’s most populous city, in 2014; and Chennai (the sixth-large city in India) in 2019. Unfortunately, I expect that this trend will continue, becoming more frequent in the future. I personally still have access to clean water, but I now think more critically about it: how tenuous the supply can be, and how it would affect me if it went away. I have a heightened appreciation on a personal level for the logistics and efforts involved in securing clean drinking water.

CHAPTER FIVE

PERSONAL AND PROFESSIONAL IMPACT

These courses and experiences helped propel me from learning into action. I translated these learnings to my own life, in various ways. I took on leadership roles in youth organizations for my children, both related to sustainability, in order to model and help lead the way for the next generation. And in my workplace, I have been able to leverage my position to promote sustainability to others throughout the University, in many different areas.

PERSONAL

One of the most important ways to impact our future in a sustainable way involves the next generation. As Whitney Houston famously sang: I believe the children are our future; teach them well, and let them lead the way. (Masser, 1985) In order to help shape the next generation to incorporate sustainable activities in their own lives, I took on leadership roles to help my twins, Madeline and Elijah, in their own young lives.

In 2019, I was co-advisor to my daughter's Silver Award in sustainability for Girl Scouts: reducing plastic bag usage in our community. In this role, I helped guide my daughter on sustainability issues, and saw her become an active leader in her own right. (The Silver Award is the second-highest honor in Girl scouts, with the highest - the Gold Award - being similar to the better-known Eagle rank in Boy Scouts.) Madeline identified

a sustainability issue she cared about, did some research, then took action to make a difference. She hosted a table at our town's annual Green Festival in April 2019, sharing information and talking with community members about plastic bags. In May 2019, she organized and led a session at our town library: How to Make a Tote Bag from a T-shirt. Attended by more than 25 people (including a brownie troop from a neighboring town), this was a fun and practical session where everyone brought a t-shirt and scissors, and created their own reusable bag (I still use mine when I go to the drugstore). The Silver Award process was a valuable learning and teaching experience for Madeline. She knows a lot more about sustainability issues now, after all the research she conducted and activities she led and participated in. And she acted in ways that were outside of her comfort zone - by engaging strangers from our town all day at the Green Festival, and "teaching" a hands-on activity session. She felt that she had made a real difference in the lives of those she interacted with and taught. It was immensely satisfying for me to be part of this process, guiding her towards a sustainability issue that resonated with her, helping her to research and understand the issue, and finding ways to take positive action.

Figure 8 Make a Tote Bag from a T-Shirt (photo by K. Forrest, 2019)

I also became a Merit Badge Counselor (MBC) for my son Elijah's Boy Scout troop in January 2020, for the Sustainability Merit Badge. Released fairly recently in 2013, the Sustainability Merit Badge has a comprehensive approach to sustainability. Through research and critical thinking exercises, Scouts pursuing this Merit Badge cultivate an understanding of key sustainability issues such as water use, food production and food waste, energy conservation, materials and product consumption, world population, and climate change. For example, on the topic of water each scout does the following:

- develops a plan that attempts to reduce their family's water consumption and implements it for one month.

- creates a diagram, showing how their household gets its clean water from a natural source and what happens with the water after it is used.
- identifies two areas in the world that have been affected by drought over the last three years. For each area, identifies a water conservation practice (successful or unsuccessful) that has been used, and describes whether the practice was effective and why.

Figure 9 Boy Scout Troop 179 on the Delaware River (photo by K. Forrest, 2018)

The Boy Scouts have always been a leader in the environmental arena, so it's not surprising that this merit badge focused on sustainability in such a comprehensive way. Since 1948, they have been promoting "The Outdoor Code," in which Scouts pledge to do their best to "be clean in my outdoor manners; be careful with fire; be considerate in

the outdoors; and be conservation minded."[13] The BSA's focus has evolved just as environmental policy has, from strict conservation to a focus on a more holistic suite of resource use and impact issues. For the Boy Scouts, sustainability means thinking about people, the environment, and systems, and how they're all interdependent. I am excited to take on a leadership role in the Boy Scouts, and personally educate and guide children in my community towards the Sustainability Merit Badge. I have a real opportunity to help guide the mindset and behavior of the next generation, leveraging my sustainability journey to do so. My co-MBC is a steward for the Delaware River waterways, which is a nice confluence between the two Organizational Dynamics courses that affected me so deeply. We are planning to take the Scouts on a canoe trip on the Delaware River as we study local waterways, as well as visit the county wastewater plant.

PROFESSIONAL

At work, I have incorporated Sustainability into my core identity – even though it's not in my job description. Informally, I am known throughout the organization as the leader on anything related to sustainability. But as a finance professional, I rely more on facts than feelings - and can point to hard data as evidence that suggests real change. I have taken on several leadership roles at different levels of the organization. I will list and expand upon each of these and explore next steps.

[13] Boy Scouts of America website: https://www.scouting.org/outdoor-programs/outdoor-ethics/outdoor-code/

1) Eco-Rep. I serve as the Eco-Rep for the Penn Museum, serving as the liaison between the Museum and the Penn Sustainability office. I represent the Museum to the wider Penn community, and am the conduit for sharing information from the Penn Sustainability Office back to the Museum. I was aware that this group existed, but I didn't join until after my sustainability journey was underway and I realized that I could make an immediate impact by being part of this team. My first action was to facilitate the removal of space heaters from our buildings (they were prohibited, but still present). This had several effects: A) eliminated the high energy cost of space heaters, B) provided an alternative heat source with ZERO initial cost and much lower ongoing energy cost, and C) removed safety hazards. Partnering with the Penn Sustainability Office, we traded the space heaters for small heated carpets called CoziToes that are significantly safer and use much less energy. Not only did we get them for free, but we continue to reap the savings from lower energy costs every winter. This is another example of how sustainability saves money,

What's next? I currently attend monthly meetings as representative from (and liaison to) the Museum, but my plan is to transition into a leadership role. This will allow me to help in planning for the future of the team, and be actively involved in organizing sessions, inviting speakers, and facilitating cross-center information sharing and knowledge-building. My purpose being on and later helping to lead this organization is to help drive behavior change throughout the University.

2) Green Team: I founded the Museum Green Team in 2016 and continue to co-chair this very active team. The team includes cross-functional representation from throughout the Museum; each member self-selects, and each determines their own level of involvement and participation. We are a conduit of "green" information from the University, and also provide monthly "tips" from the team to Museum staff. We strive to impact behavior and form positive habits for Museum employees and have seen evidence of this in meaningful ways. The physical structure within the Museum has been changed, after replacing drinking fountains with bottle-filling stations in areas where the public has access. We made a commitment to reducing disposable cups at the monthly "All-Staff" meeting which includes all Museum employees; both hot and cold beverages are provided, everyone is asked to BYOM (bring your own mug). The feedback that we received was surprisingly positive, and after just three months the habit was firmly embedded! In fact, it has become customary for many smaller meetings throughout the month to be "BYOM" as well, which speaks to the permanent nature of this habit. Financially, this was also a gain for the organization, as the cost of the catered meeting actually decreased because cups were not provided. Indirectly, we also have less trash and/or recycling, depending on the type of cup. In November 2019 the Museum had a "Grand Reopening" where several new galleries were unveiled after many months and years of hard work. As a reward, each employee was able to receive one cup of coffee or tea, each workday, during the five weeks leading up to the grand reopening - but only if

you brought your own cup. This was a clear indication of the Green Team's impact, with the Museum's leadership team partnering with the green team on this benefit.

What's next? I would like to explore the requirements for achieving Penn's Green Purchasing award, since the Business Office where I work controls the purchasing for the Museum and already contributes to this cause. Being recognized through an established criteria (or doing more, if needed, in order to qualify) would provide another tangible measurement, and once again show the Museum's commitment to sustainability. This would translate our actions into an acknowledged award at Penn, improve the visibility of our sustainability efforts, and again show the Museum as a leader in this area.

3) Green Office Certification: We initially achieved level 3 (out of 4), then two years later achieved level 4 (highest). As one of 16 locations at this highest level, we are in good company; there are another 26 locations at level 3, 14 locations at level 2, and 4 at level 1. Recertification is required every three years, which means it is a current focus area for the Museum's Green Team. The physical award is a wooden plaque which is proudly hung in the Museum Café where both employees and the visiting public can see it. I have given several presentations to the entire Museum staff about our progress regarding the Green Office certification, which requires the staff to understand what actions have been taken and to certify that these actions have occurred. This requires a high level of engagement for staff throughout the Museum, which I help facilitate with a high level of communication about actions and achievements.

What's next? Re-certify at the highest level in 2021 and continue to engage employees about established and next-level sustainability efforts.

4) Water: Bottle-filling stations. There are nine drinking fountains throughout the Museum, and we have retrofitted four of them with a top portion that provides bottle-filling as well as a manual fountain for drinking. These four are the most public-facing fountains in the Museum, and the ones with the highest volume usage. They are located at the main entrance, in group dining, in the café, and next to the library. These four therefore have the most impact – both on behavior (training staff and communicating to visitors to bring their own bottle) and on our image (showing that we are committed to sustainability by providing these stations for people to fill their own water bottles rather than providing disposable water bottles).

What's next? Replace the remaining five drinking fountains with water-filling stations. Also, within the Museum offices, replace the eight water coolers that use Deer Park 5-gallon jugs, with Quench stations that tap into the water lines. Because of the cost involved in stalling water lines, we are working with the Facilities department and Museum leadership to determine the timeframe and build it into the operating budget.

5) PPSA Chair-elect: The Penn Professional Staff Assembly (PPSA) serves approximately 11,000 monthly-paid employees at the University of Pennsylvania, with a mission of engagement across schools and centers. I was on the PPSA board for five years, and in 2019 was elected as chair of the organization (the tri-chair leadership team spans three years). The PPSA has incorporating sustainable programming and promoting

sustainable actions activities in an intentional way, wherever possible. This functions as a role model and helps to change members behaviors when they attend PPSA events – which hopefully translates to behavior change in other venues as well. In November 2019, we hosted a lunchtime session attended by over 60 staff members: "From Desk to Dwelling, How to Promote Sustainability at Home." This took our sustainable Penn activities one step further, how we behave at home. Every year in June, we partner with the Morris Arboretum to host a tree tour on campus, led by Arborist Bob Wells. The PPSA usually provides lunch and water during all sessions, but we have decided to move to more sustainable methods. For example, Jimmy John's sandwiches are purchased in bulk to cut down on packaging, and water bottles are no longer provided. When communicating details about upcoming lunchtime sessions, this phrasing has been adopted: "*To lower the environmental impact of our programs, bottled water is not provided. Please bring water in a reusable bottle with you.*" This communicates a clear signal to the entire University about our commitment to sustainability, and suggests a behavior change for all employees to take on. Anecdotally, several employees have described how they are now in the habit of taking a reusable water bottle to all lunchtime meetings, not just ours – and they attribute it to our messaging. That's a clear indication that we're being effective and changing behaviors and habits.

What's next? I moved into the Chair role in May 2020, leading the organization for one year. All programming for the academic year has moved to a virtual format, but we continue to promote sustainability and lead by example. We have decreased our fiscal

year budget by 5% due to eliminating water and reducing packaging costs. Sustainability is a standing agenda item at monthly board meetings, and for quarterly meetings with the University Sponsors (the Executive Vice President Craig Carnaroli, and the Vice President of Human Resources Jack Heuer). We continue to increase our focus on sustainability topics, and work regularly with Penn's sustainability coordinator on programming.

As you can see, my impact at work has been substantive, and resulted in positive change in employee behavior both at the Museum and throughout the University.

I have learned so much from the Sustainability Development courses in the Organizational Dynamics program that I now see through a new lens, and as a result have taken on several leadership roles at work, and personally in youth leadership roles. I am pleased to be seen as a leader in Sustainability in my job. I regularly give presentations to Museum staff about the Green Office activities, and ways to engage with the Green Team. I report to the Museum's Director on sustainability issues and ways the Museum can take action, and the Green Team knows that we have his support. I personally receive questions or suggestions from employees throughout the Museum at every level, and am seen as an expert in this area. And I am excited about next steps for further engagement and leadership on the subject of sustainability in both Boy Scouts and Girl Scouts, where I play an active leadership role. Impacting the mindset of the younger generation is one of the most important change aspects we need to accomplish, and the youth I interact with

are passionate about taking action and are already looking for ways to contribute in their own communities. Young people will one day lead the world to face the challenges to come.

I will continue working as a leader in many facets of my life to further this engagement at work and in my own personal life to make a tangible difference in the world.

CHAPTER SIX

CONCLUDING THOUGHTS AND NEXT STEPS

A strong commitment to sustainability has always been an important part of my life, but is even more important now as a result of my coursework and experiences in this field. Through my educational journey in the MSOD program, I have come to understand Sustainable Development at a higher level than ever before and have become more actively engaged in these vital issues. While I was already living in a sustainable way, my behavior has become more focused and action-oriented than ever before, both in my personal life and also at work.

The sustainability measures I observed throughout the White Mountains (not only in hotels but also many businesses) translated to active involvement in sustainability projects in my children's youth organizations. The next generation's increased awareness and active involvement in sustainability issues will lead to improvements for the future. In addition, water crises in major cities as well as in my own home have brought a new level of understanding and appreciation of water issues. From Cape Town, South Africa, to my own freezing pipes, water crises can happen anywhere, and have major implications for those affected. Studying the early water distribution systems in Philadelphia, as well as the modern-day desalination plant in Cape May, I see how these water infrastructure systems have developed and are critical to providing clean water. These learnings have brought about behavior change to my immediate family members

and to my co-workers, and an increased investment in infrastructure both in my home and workplace.

From the wilderness of New Hampshire, to the town where I live and the city where I work, and across different organizations, I have examined, participated in, and led a wide variety of sustainability activities. I have a newfound appreciation for the challenges these organizations face, along with a personal role in leading change for the next generation.

REFERENCES

(n.d.). *2019-20 MSOD and MPhil Student Handbook.*

Bateh, J. H. (2014). Towards A Theoretical Integration of Sustainability: A Literature Review and Suggested Way Forward. *Journal of Sustainability Management*, 35-42.

Brinkmann, R. (2016). *Introduction to Sustainability.* Hoboken: Wiley-Blackwell.

Brundtland, G. (1987). *Report of the World Commission on Environment and Development: Our Common Future.* Oxford: Oxford University Press.

Cassim, Z. (2018). Cape Town Could be the First Major City in the World to Run Out of Water. *USA Today*.

Dezenhall, E. (2014). *Glass Jaw: A manifesto for defending fragile reputations in an age of instant scandal.* New York: Hachette Group.

Doppelt, B. (2010). *Leading Change Toward Sustainability: A Change Management Guide for Business, Government, and Civil Society.* New York: Greenleaf Publishing Limited.

Drexhage, J. a. (2012). *Sustainable Development: from Brundtland to Rio.* New York: United Nations.

Fowler, B. K. (2005, Feb). Stability and Collapse, Old Man of the Mountains, Franconia Notch, New Hampshire. *Environmental and Engineering Geoscience*, pp. 17-27.

Foy, G. (2018). *Run the Storm: A Savage Hurricane, a Brave Crew, and the Wreck of the SS El Faro.* New York: Simon & Schuster.

Franz-Balsen, A. &. (2007). Managing Sustainability Communication on Campus: Experiences from Lüneburg. *International Journal of Sustainability in Higher Education*, 431-445.

George, B. (2008). The Willeys and the Willey House. *New Hampshire Adventures* , 1-2.

Glennon, R. (2009). *Unquenchable: America's Water Crisis and What To Do About It.* Washington D. C.: Island Press.

Hawken, P. (2017). *Drawdown: The Most Comprehensive Plan ever Proposed to Reverse Global Warming.* New York: Penguin Books.

Hawthorne, N. (1854). *Twice Told Tales.* Boston: Ticknor and Fields.

Heggie, J. (2020, August 12). Why is America running out of water? *National Geographic*.

Johnson, C. (2006). *This Grand and Magnificent Place: The Wilderness Heritage of the White Mountains.* Durham: University of New Hampshire Press.

Kidd, C. (1992). The Evolution of Sustainability. *Journal of Agricultural and Environmental Ethics*, 1-26.

Koziol, J. (April 18, 2017). Construction Begins on Glen House Hotel at Mount Washington Auto Road. *New Hampshire Union Leader*, 1-2.

Koziol, J. (December 6, 2016). Elevation could be issue for Cog Hotel. *New Hampshire Union Leader*, 1-3.

Krakauer, J. (1999). *Into Thin Air: A Personal Account of the Mount Everest Disaster.* New York: Anchor Books.

Masser, M. (1985). Greatest Love of All [Recorded by W. Houston].

Mayer, D. &. (2012). *Mountain Voices: Stories of Life and Adventure in the White Mountains and Beyond.* Boston: Appalachian Mountain Club.

McKenzie, D. (2018, March 9). Day Zero Deferred, but Cape Town's Water Crisis is Far From Over. *CNN*.

Nations, U. (1973). *Stockholm Declaration.* UN General Assembly.

Primack, R. (2014). *Climate Change Comes to Thorouh's Woods.* Chicago: Univeristy of Chicago Press.

Quinn, R. E. (2010). *Becoming a Master Manager: A Competing Values Approach.* New York: John Wiley & Sons.

Richter, B. (2014). *Chasing Water: A Guide for Moving from Scarcity to Sustainability.* Washington D.C.: Island Press.

Saal, P. (2018). Cape Town to get Real Water - Thunderstorm, Rain Warning for Cape. *Times Live South Africa*.

Sedlak, D. (2014). *Water 4.0: The Past, Present, and Future of the World's Most Vital Resource.* New Haven: Yale University Press.

Tercek, M. R. (2013). *Nature's Fortune: How Business and Society Thrive By Investing in Nature.* New York: Basic Books.

Tolles, B. F. (1998). *The Grand Resort Hotels of the White Mountains: A Vanishing Architectural Legacy.* Boston: David R. Godine.

UNFCCC. (1997). *Kyoto Protocol.* Kyoto, Japan.

United Nations. (1972). *Stockholm Declaration.*

United Nations. (1992). *Agenda 21, Rio Declaration.* New York: United Nations.

Waterman, G. &. (2000). *Wilderness Ethics: Preserving the Spirit of Wildness.* Woodstock: Countryman Press.

Wilson, E. O. (2002). *The Future of Life.* New York: Albert A. Knopf.

Winter, H. (2005). *Trade-Offs: An Introduction to Economic Reasoning and Social Issues.* Chicago: University of Chicago Press.