

Fighting Beneath the Surface

Exploring How Community-Based Marine Debris Cleanups Can Be
Therapeutic Recreation for Active Duty Service Members and Veterans



Fawn D. Liebengood, MBA
Capstone Report
June 11, 2020

Marine Biodiversity and Conservation
Scripps Institution of Oceanography
University of California, San Diego

X Kristen H. Walter, PhD
Dr. Kristen Walter
Naval Health
Research Center

X S. Rubin
Steve Rubin
WAVES Project

X Sara-Jeanne Royer
Dr. Sara-Jeanne Royer
Scripps Institution of
Oceanography

Executive Summary

There is a substantial amount of plastic polluting our oceans. Increasing numbers of our military suffer from mental health issues like post-traumatic stress disorder (PTSD), traumatic brain injury, and depression. Wouldn't it be great if we could use the marine debris problem to help alleviate mental health issues among military service members and veterans? We can - through Blue Ocean Warriors (BOW), which will be the first military-centered environmental nonprofit organization. BOW's mission is to enrich our military's lives through community-based marine debris cleanups while empowering them in the fight to eradicate marine plastic pollution. BOW envisions a world where our military is not impaired by mental health concerns. A world without plastic-filled oceans, lakes, rivers, and beaches. A world where local communities embrace and support their military community members and where the military treats local communities with respect. BOW envisions a circular economy society where everyone reuses resources and does not waste them. BOW will be led by a marine debris expert passionate about helping our military with a unique psychology, nonprofit business, entrepreneurship, and science background. BOW's goal is to transform our service members and veterans into ocean advocates by spreading the environmental knowledge and love for the ocean they gain from marine debris cleanups to their peers, while supporting others to make positive environmental changes in their own lives. Marine debris is polluting our oceans and mental health concerns among our military are worsening, leading to increased suicide and destructive behaviors, but through the concept of "Blue Mind" both problems can be alleviated. Therefore, we need Blue Ocean Warriors to not only improve the health of the ocean, but to improve mental health issues among military service members and veterans.

Keywords: marine debris, military, veterans, blue mind, mental health, therapeutic recreation.

Table of Contents

Executive Summary	2
Project Motivation	4
Marine Plastic Pollution	4
Alleviating our Military's Mental Health Issues	4
Problem Statements	5
Marine Plastic Pollution	5
Mental Health Concerns Among Service Members and Military Veterans	6
Solution to Problem	7
Goals and Objectives	7
Literature Review	7
A. Blue Mind	7
B. Time in Nature	8
C. Green Exercise and the Blue Gym Initiative	8
D. Volunteering	9
E. Community Reintegration	9
F. Blue Mind's Effect on Service Members and Military Veterans	10
Vision	10
Nonprofit Business Plan	11
Capstone Committee	11
Lessons Learned	12
Next Steps	12
Conclusion	12
References	14

Project Motivation

Marine Plastic Pollution

Standing waist deep in the ocean with the incoming waves crashing into me, I carefully balanced myself between rocks as I cut up a 2,000 lb. ghost fishing net with Surfrider Kaua'i's volunteers. Under the conditions, many people would give up or simply not care that this net washed ashore, but the critically endangered Hawaiian Monk Seal sleeping on the beach a few hundred feet away from us motivated me to keep cutting. Hundreds of cuts and a few hours later, we successfully pushed the net out of the water. Tired but triumphant, I looked out at the ocean knowing full well there were more ghosts lurking at sea. In 2018, NOAA removed 82 tons of ghost fishing nets and other marine debris from the Northwestern Hawaiian Islands. Although we won the battle on the beach that day, the war against marine debris continues.

When I was four years old, I wanted to be a Marine Biologist. My life led me along a different path until I witnessed the marine life I loved so much entangled in fishing line or starved to death after ingesting microplastics. I felt compelled to take action about the marine debris epidemic plaguing our oceans. I did not become a Marine Biologist, but I would help protect the marine life I loved so much from marine debris.

Full of inspiration, I began removing marine debris from my favorite beaches and reefs. But upon realizing the scope of marine debris' impact in Hawai'i, I knew more had to be done than just reactive cleanups. In 2014, I cofounded 808 Cleanups, an environmental nonprofit organization dedicated to restoring Hawai'i's natural beauty by empowering volunteers to conduct decentralized cleanups from ridges to reefs. I partnered with Hawai'i Wildlife Fund, to coordinate and implement the removal goal for NOAA's 2016 and 2018 Marine Debris Action Plans where we strategized proactive solutions to decrease marine debris' impact in Hawai'i. To further promote collaboration, I created the Hawai'i Environmental Cleanup Coalition (HECC) to support the Polynesian Voyaging Society canoe, Hokule'a's worldwide voyage. HECC coordinated Hawai'i's ten largest cleanup nonprofit organizations, increased their joint cleanups, and mapped their cleanup data in ArcGIS. Additionally, I educated my colleagues about "Harnessing the Power of Community to Fight Marine Debris" through presenting our poster at the Sixth International Marine Debris Conference. I also created an education campaign for kids and their parents about marine debris, "trash blindness", and litter degradation through Zippy's Restaurants' kids' menu. Most importantly, I sharpened my passion for marine debris prevention and removal, yet I knew my efforts would not be sufficient to make a lasting difference in our fight against marine plastic pollution.

Alleviating our Military's Mental Health Issues

One of the hardest things I have ever had to do was watch someone I loved deploy to Iraq. My greatest fear was not that they wouldn't come home, but that they would come home a completely different person, which is exactly what happened.

Although my Grandfather served in the Navy and I had church friends join the military, it wasn't until I went to Hawai'i that I truly understand what serving in the military meant. I fell in love with a Marine and through he and his friends, I saw the reality of military life. I saw these men and

women wake up early day after day, train day and night learning how to be lethal warriors, and eat terrible food all to serve their country. Yet these people were the kindest, sweetest, most selfless group of people I had ever met. I felt like I was surrounded my modern-day superheroes.

Years later, I had the honor of serving our military through the Single Marine and Sailor program, which provided recreation and volunteer activities for single or unaccompanied Marines and Sailors. My time with them reinforced my belief that underneath their often tough exterior and occasional bad behavior, they were remarkable people thrust into an unimaginable war at a very young age. My time with them changed my life and led me down my current path.

Problem Statements

Marine Plastic Pollution

When plastic was created in the 1940s, families celebrated the dawn of a new, convenient, disposable lifestyle. Yet, as we learn more about it, plastic's harmful impact becomes more evident. If not reused or properly managed, plastic can transform into insidious marine debris. According to the National Oceanic and Atmospheric Administration (2020), marine debris is "any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes". Since marine debris is mostly plastic, experts often refer to marine debris as marine plastic pollution. A large portion of marine debris is attributed to items related to the fishing industry such as ghost nets, which are abandoned fishing nets that circulate through our oceans "ghost fishing" by continuing to catch everything in their path and destroying coral beds before washing ashore. If plastic production and waste management practices remain the same, 12,000 metric tons of plastic will pollute our environment or be landfilled in the next 30 years (Geyer, Jambeck, & Law, 2017). Hardesty and colleagues (2015) found plastic in 90% of seabirds' intestines and whales have starved to death after ingesting plastic bags (Borunda, 2019). Yet according to the World Economic Forum (2016), global plastic production is projected to more than triple by 2050, accounting for 1/5 of all fossil fuel consumption and increasing greenhouse gas emissions. Royer and colleagues (2018) showed that plastic releases methane as it breaks apart, which is 21 times more powerful than CO₂. They found that plastic exposed to air produces more than twice as much methane as plastic submerged in water and 76 times more ethylene, another greenhouse gas. The more plastic we choose to produce, the more methane we release into our atmosphere that accelerates climate change. An Asia-Pacific Economic Cooperation (2019) report showed that marine debris cost an estimated \$10.8 billion in annual damage to the marine economy sectors and predicted this cost to rise to \$216 billion by 2050 if no preventative action is taken. The Earth Day Network (2018) found that nearly 168 million metric tons of plastic produced in 2016 was single-use plastic. Plastic pollution is not restricted to just our oceans. Plastic has been found in the Arctic snow, the air we breathe, and human feces (Bergmann et al., 2019; Schwabl et al., 2019). When humans ingest plastic, they absorb toxic chemicals like polychlorinated biphenyls (PCBs) that can lead to cancers, birth defects, impaired immunity, endocrine disruption, and other ailments (Azoulay et al., 2019). Plastic that is not landfilled or incinerated finds its way down the watershed into one of five ocean gyres where it photodegrades over time. The largest ocean gyre is the Great Pacific Garbage Patch (North Pacific Subtropical Gyre) located between Southern California and Hawai'i. Because of Hawai'i's location in the Pacific Ocean, the Hawaiian Islands become a magnet for marine plastic.

At least 100,000 lb. of marine plastic washes ashore across the Hawaiian Islands each year, but it is mostly from international - and not local – sources (Brignac et al., 2019).

Mental Health Concerns Among Service Members and Military Veterans

Service members and veterans often experience mental health concerns, such as post-traumatic stress disorder (PTSD), depression, and substance use. For those with a mental health disorder, it is common to have more than one diagnosis (Kessler, 1994). Among active duty military personnel, Blakeley and Jansen (2013) demonstrated that mental health diagnoses increased 65% between 2001 and 2011. They also found that among the service branches, Army and Marine Corps veterans experienced the highest rates of PTSD, major depression, substance abuse, and alcohol abuse.

According to the American Psychological Association (2013), PTSD is “a psychiatric disorder that can occur in people who have experienced or witnessed a traumatic event such as a natural disaster, a serious accident, a terrorist act, war/combat, rape or other violent personal assault.” Symptoms of PTSD include unwanted recurring memories of the traumatic event such as flashbacks and nightmares, avoiding anything that may remind you of your trauma, negative mood and internal dialogue, and hyper-arousal, difficulty sleeping, and isolation. According to the Department of Veterans Affairs (2018), approximately 20% of Iraq and Afghanistan, 12% of Desert Storm, and 30% of Vietnam veterans have been diagnosed with PTSD. Depression is defined by the American Psychological Association (2013) as the experience of persistent sadness and/or loss of pleasure in activities individuals previously enjoyed, combined with other symptoms such as feelings of hopelessness, fatigue, concentration difficulties, or changes in eating and sleeping. Within the military, Army veterans were diagnosed with depression more than other branches (Blakeley & Jansen, 2013). Psychological symptoms among service members and veterans, such as those related to PTSD or depression, can result in alcohol or drug use in an attempt to self-medicate their psychological symptoms (Luciano, et al., 2019). Additionally, Brady and colleagues (2019) found that younger, less educated, unmarried, low-ranking male veterans had higher levels of substance abuse and that long deployments and exposure to combat increased substance abuse rates. Substance abuse was also greater in military veterans that also have PTSD, depression, and traumatic brain injury compared to military veterans without these conditions.

Importantly, mental health disorders can increase the risk for suicide. According to the United States Department of Veterans Affairs (2019), 17 veterans commit suicide every day and veterans’ suicide rate is 1.5 times higher than non-veterans. In 2011, 915 active duty military personnel attempted and 301 committed suicide (Blakeley & Jansen, 2013). Of the deceased, 11% were diagnosed with depression, 16% with anxiety disorder, and 25% with substance abuse (Blakeley & Jansen, 2013). Although evidence-based treatments exist for these mental health disorders, many service members and veterans do not seek treatment for mental health concerns (Hoge et al., 2004) and half of the veterans diagnosed with PTSD do not seek treatment (U.S. Department of Veterans Affairs, 2018). For those who do seek treatment, they may not receive evidence-base treatments, wish to receive them, or benefit from these treatments. Therefore, it is important to identify standard treatment approaches – as well as alternative and adjunctive approaches – to address mental health concerns among veterans and service members.

Solution to Problem

While I was satisfied with the work 808 Cleanups was conducting, I knew that something was missing. I had three passions in life: 1) helping our military, 2) removing and preventing marine debris, and 3) protecting marine life, but I could not quite see how all three of these areas fit together until I presented my poster at the Sixth International Marine Debris Conference in San Diego. A beach cleanup coordinator from Florida was describing how she was working with homeless volunteers to help clean up Florida's parks. As she spoke, everything fell into place - I could use community-based marine debris cleanups to help military service members and veterans. By removing and preventing marine debris, I could also help protect marine life from marine debris. Finally, I could see how my life passions fit together. I am founding a nonprofit organization dedicated to helping our military service members and veterans overcome their mental health concerns while protecting our marine life from marine debris through marine debris cleanups.

Goals and Objectives

Blue Ocean Warriors (BOW) will "enrich our military's lives through marine debris cleanups while empowering them in the fight to eradicate marine plastic pollution." My plan is for BOW to expand gradually, so that full-time work in marine debris prevention and securing stable organization funding can be achieved.

Literature Review

Based on review of the current literature combined with personal experience, BOW believes that community-based marine debris cleanups can be used to help alleviate the mental health concerns of service members and veterans. There is emerging evidence about how spending time outside, specifically in the water, can help alleviate psychological symptoms and other military service-related issues. Research indicates that experiencing blue mind, time in nature, green exercise, the blue gym initiative, volunteering, and spending time with the community can generate psychological, physiological, and environmental benefits.

A. Blue Mind

People have a natural bias towards water, which Nichols (2014) described as "Blue Mind", "the meditative, relaxed state we enter when we are in, on, near or under water." Research has supported Blue Mind theory in several ways. People living near coastal environments are less stressed, exercise more frequently, and have better social interactions than people living inland (Cherrie et al., 2015; Hartig et al., 2014). Additionally, Kurt and Osueke (2014) found that the color blue invokes soothing feelings and soft blues help calm the mind and aid focus. For example, seeing photographs of natural and urban environments, White and colleagues (2010) showed that people prefer environments with water significantly more than those without and are willing to pay \$30 more per day to stay in an ocean-view room. According to Psychology Professor William Dorfman, "the white noise of waves breaking on the rocks relaxes our brains and stimulates the production of feel good chemicals in our body, including serotonin and dopamine" which help to create positive emotions and improve mood (Boracchi, 2017). Clearly, research supports Blue Mind theory and supports the idea that being near or in the water is both psychologically and

physiologically beneficial. BOW's goal is to have our volunteers experience these blue mind benefits by participating in marine debris cleanups.

B. Time in Nature

John Muir once said, "In every walk with nature, one receives far more than he seeks." Being in nature helps people recover from stress and attention fatigue, encourages social interaction and exercise, and helps foster a sense of purpose and personal development (Hartig et al., 2014). Using an app called Mappiness, MacKerron and Mourato (2013) discovered that participants were significantly happier in warm, sunny outdoor locations and reported feeling the happiest in marine and coastal environments. In addition to making us happy, time in nature can be restorative. In California, Hipp and Ogunseitan (2011) surveyed beachgoers to determine how psychologically restorative coastal parks were based on objective and perceived environmental conditions. They found beaches to be very restorative, that the most fatigued and stressed beachgoers felt the most psychologically restored by the beach, and psychological restorativeness increased by nearly 80% if participants perceived the Pacific Ocean as healthy or very healthy. Yet in today's busy world, we often forget how important spending time in nature is for our wellbeing. Mayer and colleagues (2009) demonstrated that brief nature exposure led to feeling significantly more connected to nature, improved focus, increased positive emotions, and greater ability to self-reflect back on life's challenges. Given all of these benefits, no wonder many people seek to spend time outdoors in nature. BOW will provide service members, veterans, and community members with the opportunity to spend time outdoors – and in the water – in order to facilitate the psychological benefits shown following outdoor activities.

C. Green Exercise and the Blue Gym Initiative

Green exercise refers to physical activity in the presence of nature (Barton & Pretty, 2010). The Blue Gym Initiative built on the green exercise idea by using coastal environments to improve human health while encouraging people to participate in conservation efforts, promote environmental awareness, and engage in good stewardship practices (White, et al., 2016). In a meta-analysis, Barton and Pretty (2010) found that self-esteem and mood improved after short-term exposure to green exercise, with the greatest improvement shown in waterside surroundings. Furthermore, Thompson-Coon and colleagues (2011) found that green exercise improved participants' self-esteem, vitality, positive engagement, vigor, and energy levels; and decreased feelings of tension, confusion, anger, and depression compared with indoor exercise. Similarly, Rogerson and colleagues (2016) demonstrated that participants socially interacted longer during green exercise than indoor exercise. Research indicates that exercising outdoors, especially near or in the ocean can produce greater psychological benefits than indoor exercise. Exercise is built into military culture and can serve as an important foundation for BOW. Participating in marine debris cleanups is physically demanding from carrying large, awkward, and heavy pieces of marine debris across a sandy beach to freediving 15 feet underwater and removing fishing line. BOW's cleanups will present a new physical challenge for volunteers while directly benefitting the environment.

D. Volunteering

In 1961, President Kennedy called Americans to service declaring, “ask not what your country can do for you—ask what you can do for your country” and many answered by volunteering their time (Kratz, 2017). Volunteering is a selfless act of service and has psychological and physiological benefits for those who volunteer. In terms of psychological benefits, research shows that people who volunteer had lower depression rates partly because volunteering helped foster community engagement and social interaction (Mayo Clinic Health System, 2017). Volunteering has also been shown to reduce stress, help foster a sense of purpose, and teach valuable skills that can be transferred to a job. Yeung and colleagues (2017) found that life satisfaction and social wellbeing were also positively correlated with volunteering. In terms of physiological benefits, Dr. Carlson at the Johns Hopkins Bloomberg School of Public Health (2009) found that volunteering can delay or reverse declining brain function. Additionally, volunteers were less likely to develop high blood pressure that can lead to heart disease and stroke than peers who don’t volunteer (Sneed & Cohen, 2013). Compared to their peers, volunteers who consistently and frequently volunteered tended to live up to four years longer than non-volunteering peers (Konrath et al., 2012). Research supports the idea that volunteering rewards those who give their time and energy supporting causes important to them. Service members may seek out volunteer opportunities for a variety of reasons, including letters of appreciation received after volunteering that can be used for promotion packages. After transitioning out of the military, veterans may seek the camaraderie that they experienced during service and wish to contribute a larger mission, which will both be provided through volunteering with BOW.

E. Community Reintegration

Upon returning from deployment or discharging from the military, military personnel and veterans can struggle adjusting to civilian life. Community reintegration refers to the journey to rejoin society after military service. A Danish study found that upon returning from Afghanistan, nearly 20% of military veterans had difficulty functioning in interpersonal relationships, confiding in others, attending to household chores, and taking care of their health (Karstoft et al., 2015). Some military veterans said that connecting with others, choosing to be positive and optimistic, and engaging in cathartic activities helped them to reintegrate after deployment (Hinojosa & Hinojosa, 2011). Military veterans also expressed how important connecting with other veterans who understood their struggles was in order to help them reintegrate into society (Wands, 2013). One nonprofit organization that tries to foster this connection is Team Red, White, and Blue (RWB), which provides regular social interaction for active duty military personnel, military veterans, their families, and civilians through physical and social activities. A research study by Angel and colleagues (2018) showed that Team RWB’s most active volunteers reported 81% positive life satisfaction, 53% reported better relationships with their civilian peers, and 70% had a stronger professional network than other less active veterans. Current research indicates that spending time with the local community and fellow military veterans is psychologically beneficial for those returning from deployment. For example, when service members arrive to a new duty station they often do not know anyone outside of their military installation/base. Participating in marine debris cleanups through BOW could provide an active way for service members and their families to engage in the community and establish new connections while enjoying nature. Furthermore, BOW provides service members and veterans with unique environmental knowledge gained

through participation in marine debris cleanups that they can share with their peers, the military community, and the civilian community when they change duty stations or transition out of the military.

F. Blue Mind's Effect on Service Members and Military Veterans

Isak Dinesen once said, “the cure for anything is saltwater — sweat, tears, or the sea”; perfectly encapsulating Blue Mind theory. Various types of water-based recreation such as scuba diving, surfing, sailing, and fly fishing, have been used to help service members and veterans (often in addition to traditional therapy) and have shown physiological and psychological benefits. A small pilot study conducted by Unser and colleagues (2011) found that a four-day scuba diving trip for wounded military veterans reduced participants' symptoms of PTSD by 80%, obsessive-compulsive disorder by 15%, and depression by 15%. In addition to the psychological benefits, the scuba diving trip also produced physiological effects and improved wounded veterans' motor function by 20-30%, reduced muscle spasticity by 15%, and increased their sensitivity to touch by 5-10%. After a year-long sailing nature adventure rehabilitation, Gelkopf and colleagues (2013) found that PTSD, depression, and quality of life improved. Daily functioning, hope, and perceived control over illness showed the largest improvements after the sailing intervention. Walter and colleagues (2019) demonstrated that surf therapy significantly improved positive affect, and significantly decreased symptoms of depression, anxiety, negative affect, and PTSD for active duty service members following a six-week surf therapy program. Through participant observation and interviews, Caddick and colleagues (2015) revealed that surfing provided veterans with something to look forward to, relief from their service-related stress, and helped them stay in the present rather than dwelling on past traumas. These veterans chose to surf because it was a fun activity, not because they were seeking mental health treatment. To determine the effects of their nonprofit organization, Rivers of Recovery held a multi-day fly-fishing retreat for military veterans with PTSD. The veterans completed psychosocial assessments before, during, and after the retreat. Perceptual stress and PTSD symptoms both decreased by 19% after the fly-fishing trip. The fly-fishing trip also increased veterans' self-assuredness by 33%, serenity and cheerfulness by 67%, and positive affect by 47% from the veterans' initial survey (Rivers of Recovery, 2018). Consistent with emerging literature, BOW will provide volunteers the opportunity to engage in water-based therapeutic recreation through swimming, snorkeling, freediving, and scuba diving for marine debris with the goal of providing psychological benefits to BOW's volunteers.

Vision

BOW envisions a world without our military committing suicide or self-harm. A world where our military is not impaired by mental health concerns like PTSD, depression, substance abuse. A world without plastic-filled oceans, lakes, rivers, and beaches. A world where local communities embrace and support their military community members and military community members treat local communities with respect. BOW envisions a circular economy society where everyone reuses resources and does not waste them. BOW will be built on the core values of 'Ohana (family), empathy, respect, selfless service, respect, and fun.

Nonprofit Business Plan

Similar to a business, a plan is required for nonprofit organizations to succeed. A nonprofit business plan (NBP) is the blueprint of the nonprofit organization. I spent the Spring Quarter writing a thorough NBP to help explore the feasibility of the nonprofit as a business and to set a plan for the next three to five years. The NBP will outline how BOW will be run, who will be responsible for each task, how BOW plans to achieve its goals, and ultimately, how BOW will make a positive impact for service members, military veterans, and the environment.

Capstone Committee

To make BOW's NBP as strong as possible, I sought out expert advice from leaders in mental health, military wellbeing, nonprofit, academia, and business.

[Dr. Kristen Walter](#) - Clinical Research Psychologist at the Naval Health Research Center (Chair)
Dr. Walter investigates the treatment of PTSD and conditions that commonly co-occur with PTSD, such as major depressive disorder and traumatic brain injury (TBI). Her research explores both evidence-based treatments for PTSD and co-occurring conditions, as well as complementary and alternative approaches (i.e., physical activity, such as surf and hike therapy).

[Dr. Sara-Jeanne Royer](#) - Post-Doctorate Researcher at Scripps Institution of Oceanography
Dr. Royer is a biological oceanographer and currently studying the degradation of plastic and microfibers in the environment. She has investigated the pathways and fate of marine debris and plastic pollution in the ocean, greenhouse gases emission from plastics in the environment, and served as the science advisor for Sustainable Coastlines Hawai'i. In addition to her background in environment and marine biology, she was the first female sergeant leading a group of 40 people in the first French Canadian regiment of the Canadian Army and served in Afghanistan in Kabul and Kandahar.

[Steve Rubin](#) - Founder and President of The Waves Project
The WAVES Project is a 501(c)3 nonprofit organization using the therapeutic values of water and SCUBA Diving to help our wounded veterans rehabilitate from injuries received while serving their country. The WAVES Project serves any veterans suffering from physical or mental injuries such as amputation, spinal cord injuries, TBI, and PTSD obtained during their service.

I also contacted others to assist with several of the technical aspects of my NBP. Through networking, I connected with Dialogues in Action, a nonprofit consulting agency rethinking the development of people through a developmental approach to leadership, evaluation, and strategy. For help with marketing strategy, I spoke with Barry Gilman, a Chartered Financial Analyst and Marketing Consultant with Longevity Financial Consulting and Dr. Ayelet Gneezy, an Associate Professor of Behavioral Sciences and Marketing at UCSD's Rady School of Management. For general nonprofit consulting advice, I spoke with Gwen Klapperich, Training Coordinator at the Hawai'i Alliance of Nonprofits and Eric Salzwedel, owner of Intentional Purpose Consulting.

Lessons Learned

Through writing BOW's business plan, I learned several new ways of thinking about nonprofit operations that will be great assets moving forward with BOW. I learned that current research supports the idea that marine debris cleanups could produce blue mind benefits for service members and veterans. Dr. Walter taught me an important lesson by correcting my terminology that the term "military veteran" does not include active duty military personnel. I also learned that marketing and evaluation are areas in which I could use continued growth. I am incredibly grateful to have Dialogues in Action, Mr. Gilman, and Dr. Gneezy's assistance with the NBP. Dialogues in Action taught me that evaluation programs should not only be designed to engage people's minds, emotion, and behavior (Know/Feel/Do), but also penetrate a person's core, motivation, heart, and drive (Believe/Love/Become). Lastly, Mr. Gilman and Dr. Gneezy helped me think beyond marketing means like social media advertisements and to consider marketing more broadly by drawing others into your business, capturing their time, and fostering their willingness to provide financial support.

Next Steps

Now that BOW has a completed business plan, my next steps are to 1) identify board members, 2) file for 501(c)3 nonprofit status with the Internal Revenue Service, and 3) secure seed funding. Ideally, I would like to pilot BOW in a scientific research study and evaluate Blue Mind's effect on service members and veterans during cleanups in the field before filing for BOW's nonprofit status.

Conclusion

Marine debris is polluting our oceans and mental health concerns among our military are worsening, leading to increased suicide and destructive behaviors, but through Blue Mind both problems can be alleviated. Therefore, we need Blue Ocean Warriors to provide community-based marine debris cleanups to help reduce the impact of mental health issues on military service members and veterans.

Current research supports the idea that community-based marine debris cleanups can be used as a source of therapeutic recreation to improve the mental health of service members and veterans. BOW will be a 501(c)3 nonprofit organization that enriches our military's lives through marine debris cleanups while empowering them in the fight to eradicate marine plastic pollution. BOW will have two programs: Marine Debris Missions and Operation Ghost Net. BOW will be led by an Executive Director and policy board style of board of directors. BOW will evaluate its programs through a combination of quantitative surveys, qualitative interviews, and quantitative cleanup data. BOW will finance its operations through a combination of sponsorships; private donors; private, foundation, city, state, and federal grants; social enterprise; corporations; and fundraising events. BOW will target active duty military personnel from all military branches, military veterans, and the local community as its volunteers. While other marine debris removal and military support nonprofits exist, BOW will be the first military-centered environmental nonprofit organization.

With our military community's help, Hawai'i's natural beauty can be restored. By removing marine debris from Hawai'i's beaches and reefs, enjoying the benefits that being on the beach and in the

Fawn D. Liebengood, MBA
2020 Capstone Report

Submission for Master of Advanced Studies
Marine Biodiversity and Conservation

ocean can offer, and engaging in green exercise while giving back to their community, service members and veterans mental health issues, such as PTSD and depression, can be alleviated.

References

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Retrieved from <https://doi.org/10.1176/appi.books.9780890425596>
- Angel, C. M., Smith, B. P., Pinter, J. M., Young, B. B., Armstrong, N. J., Quinn, J. P., ... Erwin, M. S. (2018). Team Red, White & Blue: A community-based model for harnessing positive social networks to enhance enrichment outcomes in military veterans reintegrating to civilian life. *Translational Behavioral Medicine*, 8(4), 554–564. <https://doi.org/10.1093/tbm/iby050>
- Asia-Pacific Economic Cooperation. (2019). *Update of 2009 Apec Report on Economic Costs of Marine Debris To Apec Economies Penultimate Version – in Confidence Update of 2009 Apec Report on Economic Costs of Marine*. (March), 79. Retrieved from <https://www.apec.org/Publications/2020/03/Update-of-2009-APEC-Report-on-Economic-Costs-of-Marine-Debris-to-APEC-Economies>
- Azoulay, D.; Villa, P.; Arellano, Y.; Gordon, M.; Moon, D.; Miller, K.; Thompson, K. (2019). *Plastic & Health: The Hidden Costs of a Plastic Planet*. Retrieved from www.ciel.org/plasticandhealth
- Barton, J., & Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health- A multi-study analysis. *Environmental Science and Technology*, 44(10), 3947–3955. <https://doi.org/10.1021/es903183r>
- Bergmann, M., Mützel, S., Primpke, S., Tekman, M. B., Trachsel, J., & Gerdts, G. (2019, August). White and wonderful? Microplastics prevail in snow from the Alps to the Arctic. In *Science Advances*. <https://doi.org/10.1126/sciadv.aax1157>
- Blakeley, Katherine; Jansen, D. J. (2013). CRS Report for Congress Post-Traumatic Stress Disorder and Other Mental Health Problems in the Military: Oversight Issues for Congress. *Congressional Research Service*, 1–68.
- Boracchi, C. (2017). 5 (scientifically proven) reasons why the sea is good for you.
- Borunda, A. (2019). This young whale died with 88 pounds of plastic in its stomach.
- Brady, L. L., Credé, M., Harms, P. D., Bachrach, D. G., & Lester, P. B. (2019). Meta-analysis of risk factors for substance abuse in the US military. *Military Psychology*, 31(6), 450–461. <https://doi.org/10.1080/08995605.2019.1657754>
- Brignac, K. C., Jung, M. R., King, C., Royer, S. J., Blickley, L., Lamson, M. R., ... Lynch, J. M. (2019). Marine Debris Polymers on Main Hawaiian Island Beaches, Sea Surface, and Seafloor. *Environmental Science and Technology*, 53(21), 12218–12226. <https://doi.org/10.1021/acs.est.9b03561>
- Caddick, N., Smith, B., & Phoenix, C. (2015). The effects of surfing and the natural environment on the well-being of combat veterans. *Qualitative Health Research*, 25(1), 76–86. <https://doi.org/10.1177/1049732314549477>
- Carlson, M. C. (2009). For Older Adults , Participating in Social Service Activities Can Improve Brain Functions.
- Cherrie, M. P. C., Wheeler, B. W., White, M. P., Sarran, C. E., & Osborne, N. J. (2015). Coastal climate is associated with elevated solar irradiance and higher 25(OH)D level. *Environment International*, 77, 76–84. <https://doi.org/10.1016/j.envint.2015.01.005>
- Earth Day Network. (2018). *Fact Sheet: Single Use Plastics*. Retrieved from <https://www.earthday.org/2018/03/29/fact-sheet-single-use-plastics/>
- Gelkopf, M., Hasson-Ohayon, I., Bikman, M., & Kravetz, S. (2013). Nature adventure rehabilitation

- for combat-related posttraumatic chronic stress disorder: A randomized control trial. *Psychiatry Research*, 209(3), 485–493. <https://doi.org/10.1016/j.psychres.2013.01.026>
- Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, use, and fate of all plastics ever made. *Science Advances*, 3(7), 25–29. <https://doi.org/10.1126/sciadv.1700782>
- Hardesty, B. D., Good, T. P., & Wilcox, C. (2015). Novel methods, new results and science-based solutions to tackle marine debris impacts on wildlife. *Ocean and Coastal Management*, 115, 4–9. <https://doi.org/10.1016/j.ocecoaman.2015.04.004>
- Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and Health. *Annual Review of Public Health*, 35(1), 207–228. <https://doi.org/10.1146/annurev-publhealth-032013-182443>
- Hinojosa, R., & Hinojosa, M. S. (2011). Using military friendships to optimize postdeployment reintegration for male Operation Iraqi Freedom/Operation Enduring Freedom veterans. *Journal of Rehabilitation Research and Development*, 48(10), 1145–1158. <https://doi.org/10.1682/JRRD.2010.08.0151>
- Hipp, J. A., & Ogunseitan, O. A. (2011). Effect of environmental conditions on perceived psychological restorativeness of coastal parks. *Journal of Environmental Psychology*, 31(4), 421–429. <https://doi.org/10.1016/J.JENVP.2011.08.008>
- Karstoft, K. I., Armour, C., Andersen, S. B., Bertelsen, M., & Madsen, T. (2015). Community integration after deployment to Afghanistan: a longitudinal investigation of Danish soldiers. *Social Psychiatry and Psychiatric Epidemiology*, 50(4), 653–660. <https://doi.org/10.1007/s00127-014-0973-2>
- Kessler, R. C. (1994). The national comorbidity survey of the United states. *International Review of Psychiatry*, 6(4), 365–376. <https://doi.org/10.3109/09540269409023274>
- Konrath, Sara, Fuhrel-Forbis, Andrea, Lou, Alina, Brown, S. (2012). Motives for volunteering are associated with mortality risk in older adults. *Health Psychology*, 31(1), 87–96. Retrieved from <https://doi.org/10.1037/a0025226>
- Kratz, J. (2017). A Call to Public Service: the Peace Corps.
- Kurt, S., & Osueke, K. K. (2014). The Effects of Color on the Moods of College Students. *SAGE Open*, 4(1), 215824401452542. <https://doi.org/10.1177/2158244014525423>
- Luciano, Matthew T., McDevitt-Murphy, Meghan E., Acuff, Samuel F., Bellet, Benjamin W., Tripp, Jessica C., Murphy, J. G. (2019). Posttraumatic stress disorder symptoms improve after an integrated brief alcohol intervention for OEF/OIF/OND veterans. *Psychological Trauma: Theory, Research, Practice, and Policy*, 11(4), 459–465. Retrieved from <https://doi.org/10.1037/tra0000378>
- MacKerron, G., & Mourato, S. (2013). Happiness is greater in natural environments. *Global Environmental Change*, 23(5), 992–1000. <https://doi.org/10.1016/j.gloenvcha.2013.03.010>
- Mayer, F. S., Frantz, C. M. P., Bruehlman-Senecal, E., & Dolliver, K. (2009). Why is nature beneficial?: The role of connectedness to nature. *Environment and Behavior*, 41(5), 607–643. <https://doi.org/10.1177/0013916508319745>
- Mayo Clinic Health System. (2017). Helping people, changing lives: The 6 health benefits of volunteering. Retrieved from <https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/helping-people-changing-lives-the-6-health-benefits-of-volunteering>
- National Oceanic and Atmospheric Administration. (2020). Marine Debris. Retrieved from National Ocean Science website: <https://oceanservice.noaa.gov/hazards/marinedebris/>
- Nichols, W. J. (2014). *Blue Mind* (1st ed.). New York: Little, Brown, and Company.

Rivers of Recovery. (2018). Rivers of Recovery Research Results.

Rogerson, M., Gladwell, V. F., Gallagher, D. J., & Barton, J. L. (2016). Influences of green outdoors versus indoors environmental settings on psychological and social outcomes of controlled exercise. *International Journal of Environmental Research and Public Health*, 13(4).
<https://doi.org/10.3390/ijerph13040363>

Royer, S. J., Ferrón, S., Wilson, S. T., & Karl, D. M. (2018). Production of methane and ethylene from plastic in the environment. *PLoS ONE*, 13(8), 1–13.
<https://doi.org/10.1371/journal.pone.0200574>

Schwabl, P., Koppel, S., Königshofer, P., Bucsecs, T., Trauner, M., Reiberger, T., & Liebmann, B. (2019). Detection of various microplastics in human stool: A prospective case series. *Annals of Internal Medicine*, 171(7), 453–457. <https://doi.org/10.7326/M19-0618>

Sneed, Rodlescia S., Cohen, S. (2013). A Prospective Study of Volunteerism and Hypertension Risk in Older Adults. *Psychology and Aging*, 28(2), 578–586.
<https://doi.org/https://doi.org/10.1037/a0032718>

Thompson-Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review. *Environmental Science and Technology*, 45(5), 1761–1772. <https://doi.org/10.1021/es102947t>

U.S. Department of Veterans Affairs. (2018). How Common is PTSD in Veterans? Retrieved from PTSD: National Center for PTSD website:
https://www.ptsd.va.gov/understand/common/common_veterans.asp

Unser, Cody; Becker, Daniel; Kaplin, A. (2011). *SCUBA and SCI in Paralyzed Veterans: "There is a tide in the affairs of men, Which taken at the flood, leads on to fortune."*

Walter, K. H., Otis, N. P., Ray, T. N., Glassman, L. H., Michalewicz-Kragh, B., Powell, A. L., & Thomsen, C. J. (2019). Breaking the surface: Psychological outcomes among U.S. active duty service members following a surf therapy program. *Psychology of Sport and Exercise*, 45(May).
<https://doi.org/10.1016/j.psychsport.2019.101551>

Wands, L. (2013). "No one gets through it Ok": The health challenge of coming home from war. *Advances in Nursing Science*, 36(3), 186–199.
<https://doi.org/10.1097/ANS.0b013e31829edcbe>

White, M. P., Pahl, S., Wheeler, B. W., Fleming, L. E. F., & Depledge, M. H. (2016). The "Blue Gym": What can blue space do for you and what can you do for blue space? *Journal of the Marine Biological Association of the United Kingdom*, 96(1), 5–12.
<https://doi.org/10.1017/S0025315415002209>

White, M., Smith, A., Humphries, K., Pahl, S., Snelling, D., & Depledge, M. (2010). Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes. *Journal of Environmental Psychology*, 30(4), 482–493.
<https://doi.org/10.1016/j.jenvp.2010.04.004>

World Economic Forum. (2016). The New Plastics Economy: Rethinking the future of plastics. In *World Economic Forum*. Retrieved from
http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf

Yeung, J. W. K., Zhang, Z., & Kim, T. Y. (2017). Volunteering and health benefits in general adults: Cumulative effects and forms. *BMC Public Health*, 18(1), 1–8.
<https://doi.org/10.1186/s12889-017-4561-8>