Nature Engagement to Foster Resilience in Military Communities

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ABSTRACT

Stress associated with overseas military service is a major concern for soldiers, their families, and communities. Whereas actual deployment is the most obvious disruption, pre-deployment (preparing to go overseas) and post-deployment (re-integration into family and community) also cause significant stress. Several authors have suggested that when considering interventions to ease military service related stress, it is critical to take into account not only the individual as a "client" but also how military families are embedded in larger communities, and how interventions can build on existing informal and social networks and other community assets. Although largely absent from the research literature focusing on individual therapy and on community capacity in military communities, individual veterans, conservation organizations, and government agencies across the US and in the UK are initiating projects that connect returning soldiers to nature, through gardening, farming, job skills, hunting, fishing, retreat centers, camps, and outdoor adventure experiences. These initiatives are perhaps not surprising, given that extensive research from the fields of horticultural therapy and conservation psychology has demonstrated the positive outcomes of contact with nature for individual and community well-being and healing. In this chapter, we present a case for integrating nature-based and community capacity building interventions designed to foster resilience in military communities facing deployment.

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<A> Introduction

For military families and communities, war means not just the loss of fallen soldiers, but also the disruptions to daily life brought about by a cycle of preparing for loved ones to leave, months or years of their absence, and hoped for reintegration into the family and community. The Iraq and Afghanistan Wars, with their longer, repeated, and more frequent deployments, have brought the issues of military family and community stress to the fore in the US and allied nations (Chandra, Burns et al. 2008; Atkinson 2009; Chandra, Lara-Cinisomo et al. 2009; Manos 2010). The US Department of Defense has responded by putting significant resources into the Army Family Readiness Support Group[2], 4-H Military Partnership[3], Operation Military Kids[4], Army Child, Youth and School Services[5], and other initiatives created to address the issues of soldier, family, and community resilience and well-being during wartime. At least two general types of interventions are being implemented: therapeutic programs designed for individual soldiers or family members (Novotney 2009), and community capacity approaches that support soldiers and their families through integrating them into their community's existing informal and formal networks, and through creating a sense of shared responsibility and collective competencies (Bowen, Martin et al. 2000; Bowen, Mancini et al. 2003; Huebner, Mancini et al. 2009).

Largely absent from either the therapeutic or community capacity research on military family and community resilience is consideration of a role for engagement of soldiers and family members with nature (for an exception, see Hyer, Boyd et al. 1996). This is surprising in that local, nature-based efforts to address the needs of soldiers attempting to reintegrate into society, often initiated by war veterans themselves, are sprouting up in the US as well as in the UK. Many of these programs implicitly recognize what Tidball (this volume) has referred to as "urgent biophilia;" that is, during times of war and other crises people often "remember" the role of gardening, planting trees, hunting, and other forms of nature contact in helping to foster feelings of well-being and recovery (Tidball, Krasny et al. 2010). The potential healing impacts of such activities are backed up by an extensive literature in horticultural therapy and conservation psychology on the therapeutic value of gardening and green spaces, including in easing trauma and aiding in the process of recovery in individuals stunned by a crisis (Ulrich 1983; Ulrich 1984; Kaplan and Kaplan 1989; Kaplan and Peterson 1993; Miavitz 1998; Hewson 2001; Campbell and Wiesen 2009).

Despite these locally-organized initiatives and the supporting evidence from several lines of inquiry, not only researchers but also policy makers dealing with the impacts of deployment have largely ignored the role of nature contact and nature stewardship in soldier, family and community resilience. It is with this gap between emergent practices and research and policy in mind that we write our chapter, hoping to present an argument for integrating nature contact and stewardship into community-based interventions to support military communities.[6] Although we recognize that direct evidence to support our contentions about the outcomes of nature contact and stewardship for military communities is lacking, we feel that given the wealth of

[2] http://www.armyfrg.org/skins/frg/home.aspx?AllowSSL=true
[3] http://www.4-hmilitarypartnerships.org/DesktopDefault.aspx
[4] http://www.operationmilitarykids.org/public/home.aspx
[5] http://www.armymwr.com/family/childandyouth/default.aspx
[6] While recognizing the importance of individual therapeutic interventions, we focus more on community-based interventions in this chapter.

circumstantial evidence, the research and policy communities may want to seriously examine the arguments presented in this chapter.

In order to build our argument, we first present an overview of the ways in which deployment stress is impacting military families and communities, and of interventions drawing on existing community capacity to address negative outcomes of deployment. We next briefly review literature from conservation psychology that suggests a role for contact with and active stewardship of nature in individual and community level resilience, following which we describe examples of nature-based programs designed to help soldiers and their families deal with the deployment cycle. Community resilience is defined as a process linking a community's capacities to positive functioning and adaptation after a disturbance (Norris, Stevens et al. 2008 131). Although many of the examples presented below are primarily concerned with individual resilience, i.e., the ability of individuals to maintain a stable equilibrium or to adapt in the face of trauma, loss, or adversity (Luthar, Cicchetti et al. 2000; Bonanno 2004), we point out elements of these programs that have the potential to foster resilience at the community level. We conclude with several reflections and questions that emerge from applying the existing literature on community capacity to these nature-based initiatives.

<A> Military Deployment: Families and Communities under Stress

A recent Rand Corporation study concluded that nearly 1 out of every 5 military service members on combat tours in Iraq and Afghanistan returns home with symptoms of post-traumatic stress disorder (PTSD) or major depression (Tanielian and Jaycox 2008). Yet many cases of PTSD go untreated because of the stigma that the military and civilian society attach to mental disorders (Hoge, Castro et al. 2004; Tanielian and Jaycox 2008; Dingfelder 2009). The stress endured by active-duty military has manifested itself in tragic ways, including increased incidents of aggression, domestic violence, and suicide (Department of Defense 2009). Deployments also take a toll on the loved ones of military personnel. During separation and particularly when a parent is in a combat situation, children in military families display higher rates of physical ailments and of a range of behavioral and emotional problems, including anxiety, sleep disturbances, and phobias, compared to non-military family children (Drummet, Coleman et al. 2003; Chandra, Burns et al. 2008; Chandra, Lara-Cinisomo et al. 2009; Lester, Peterson et al. 2010; Manos 2010). A study of the impact of deployments of mothers on adolescent health found that 25 percent of the adolescents exhibited risk factors, including drop in school grades, poor nutrition and decreased exercise, prior to deployment compared to 75 percent during and after deployment (Ternus 2009). A separate study of nearly 200 military families revealed that even a year after parents returned from combat, 30% of the children exhibited clinical levels of anxiety requiring possible treatment (Zoroya 2009).

Whereas therapy is often the first line of defense against stress and illness related to deployment, social support systems, including friends, relatives, work colleagues, church members, and support groups, can be a critical component of a family's ability to adapt to the day-to-day realities of deployment (Drummet, Coleman et al. 2003). Similarly, for adolescents, interventions that bolster involvement in social support networks, along with those that help build parenting skills of the teen's parents and that engage youth in positive activities, are likely to be most effective in fostering resilience (MacDermid, Samper et al. 2008; Wong and Gerras 2010).

Recognizing the need for community support, the military created a national system of Family Readiness Groups, although studies in the early years of the war on terrorism questioned their effectiveness (Drummet, Coleman et al. 2003).

Research into community-based approaches to supporting military families helps to elucidate specific factors that may aid in recovery. In a study of over 17,000 married Air Force members, Bowen et al. (2003) compared the ability of three factors to predict family adaptation, defined as the ability of family members to work together in dealing with problems, to manage family responsibilities, and to demonstrate commitment and cohesion. The factors examined included: formal unit support from leaders and peers in the military; informal community support through clubs and mutual support groups, as well as through more casual networks of friends, neighbors, and work colleagues; and sense of community, defined as the degree to which members feel positively attached to the military organization and view the base community as a source of support and of connections to others and to the military as an institution. These authors found that sense of community was the best predictor of adaptation, and that informal networks were somewhat important, with formal networks not showing any significant correlation with adaptation. In a related study, Bowen et al. (2001) found that participation in community activities and to a lesser extent community connections had an indirect positive effect on sense of community through their direct effect on community capacity. According to Bowen et al. (2001, 86), "These findings suggest that a sense of shared responsibility and collective competence among community members *(i.e., community capacity)* is facilitated when members and families are more active in their community and experience greater ease in making connections with one another."

Building on a number of earlier studies of military communities, Huebner et al. (2009) proposed a community capacity building approach to supporting military families. Community capacity is composed of two elements: shared responsibility for the general welfare of the community and its members, and collective competence demonstrating the ability to take advantage of opportunities for addressing community needs and for confronting situations that threaten the safety and well-being of community members. In this model, collective concern and action are activated through existing formal and informal networks, which generate social capital, which in turn leads to family well-being and adaptation. According to Huebner et al. (2009, 222), "Capacity building is about resilience and in particular capturing the resilience possessed by military families." Furthermore, research by advocates of community-based approaches to supporting families facing deployment suggests that interventions should view community members as partners and community assets rather than as clients and beneficiaries of services, and should be designed around building formal networks that support informal social networks, should include opportunities for collective action, and should involve community members in developing interventions based on principles of shared responsibility and accountability (Bowen, Martin et al. 2000; Bowen, Mancini et al. 2003; Huebner, Mancini et al. 2009).

<A> Nature-based Interventions

In a rare study of nature-based interventions in a military setting, Hyer et al. (1996) found that the impact of removing a random sample of Vietnam veterans suffering from PTSD from their normal therapy sessions to participate in a 5-day Outward Bound course had neither a positive

nor negative impact on alleviating psychological symptoms relative to staying in the normal therapy program for that week. Whereas the results of the quantitative aspect of this study were inconclusive, Hyer et al. (1996) also conducted open-ended interviews, which revealed that the veterans were overwhelmingly positive about the Outward Bound experience in terms of increasing enjoyment of the outdoors and trust in the treatment staff, being more in control of their behavior and of their depression, and being able to do more physically. These results are similar to a qualitative study of veterans in the United Kingdom who participated in a community gardening program; veterans talked about gaining a sense of purpose, having something to anticipate, feeling relaxed, secure and safe, learning new skills, being part of growing something, being somewhere where problems are understood, and being able to share knowledge and skills with others, as benefits of participation (Atkinson 2009). Similarly, in researching his widely-acclaimed book, *Defiant Gardens*, Helphand (2006) collected significant evidence from historical documents and interviews about how gardens are critical to psychological survival during wartime; Helphand's findings have since been corroborated during numerous conversations, blog contributions, and letters from veterans and others impacted by war (Helphand, this volume). Such findings are supported by the large literature on horticultural therapy pointing to the psychological benefits of spending time in nature. However, further quantitative and qualitative studies are needed to document more fully the impacts of various types of nature contact on veterans.

Over the last ten years, researchers in the field of environmental psychology have attempted to understand the impacts of exposure to nature on humans in community settings. This work draws heavily from the pioneering work of Rachel and Stephen Kaplan who proposed the Reasonable Person Model[7] to explain the value of nature contact to humans. This model suggests that people are more healthy psychologically and thus more reasonable if they have opportunities to explore new environments and learn new information, act in meaningful ways (e.g., volunteer to help others), and experience the restorative value of nature (Kaplan and Kaplan 2001). Building on this work, Kuo and others (Kuo, Bacaicoa et al. 1998; Kuo, Sullivan et al. 1998; Kuo and Sullivan 2001; Sullivan, Kuo et al. 2004; Kaplan and Kaplan 2005) have conducted a series of controlled studies in low-income, public housing in Chicago comparing the behaviors of residents who do and do not have access to trees. Their research provides compelling evidence that being around trees in urban, crime-ridden neighborhoods has a number of benefits for residents that lead to more pro-social behaviors, including more social interaction, greater sense of community, greater neighborhood social ties, greater sense of safety and feelings of belonging, and lower levels of fear, incivilities, and aggressive and violent behavior. The relationship between common green space and neighborhood ties is mediated through use of common spaces, rather than by stress, mental fatigue, or mood, as one might have predicted based on the horticultural therapy literature or on the suggestions of the need for mental restoration after mental fatigue proposed in the Reasonable Person Model. Further, studies of the benefits of engaging in nature stewardship (rather than simply nature contact), such as urban prairie restoration and tree planting, have found additional outcomes for humans, including a sense of satisfaction from engaging in meaningful action (Miles, Sullivan et al. 1998), a sense of attachment to the neighborhood or ecosystem (Austin and Kaplan 2003; Ryan and Grese 2005), and a sense of pride and of competence that lead to further participation in neighborhood improvement (Austin and Kaplan 2003; Kaplan and Kaplan 2005). Nature stewardship or "civic

[7] http://ajph.aphapublications.org/cgi/content/abstract/93/9/1484

ecology" activities have the added benefit that they create more healthy local ecosystems, which in turn provide further opportunities for contact with nature (Tidball, Krasny et al. 2010).

Interestingly, these documented outcomes of spending time in and restoring nature have much in common with recommendations about designing programs to foster adaptations and well-being among veterans, their families, and military communities, and more generally among communities facing disaster or conflict. In particular, time spent in nature may foster a sense of community, which Bowen et al. (2003) found was associated with the capacity of military families for adaptation. Further, community gardening, community forestry, and related nature restoration activities allow individuals to demonstrate collective concern and action through existing informal and formal networks, generating social capital, which in turn leads to family well-being and adaptation, and community resilience (c.f., Bowen, Martin et al. 2000; Drummet, Coleman et al. 2003; Norris, Stevens et al. 2008; Huebner, Mancini et al. 2009). In short, the restorative effect of nature, coupled the sense of community and social connectedness that emerge from contact with and restoring nature in the presence of fellow human beings, would support the inclusion of nature contact and stewardship in designing programs to foster well-being among veterans, military families, and military communities during the deployment cycle. Whereas we recognize that other community activities may lead to similar outcomes, research and practice have largely ignored the role of nature in family adaptation and community resilience; we suggest here that nature and environmental stewardship should be included in research and practice along with other interventions.

<A> Nature-based Programs for Veterans and Military Communities

Over the last several years, a growing number of community gardening, green jobs, outdoor recreation, and other nature-based programs for veterans and their families have emerged, often initiated by veterans themselves. Whereas much of the research on plants and healing has focused on exposure to "green" (e.g., through a hospital window, Ulrich 1984; or through trees in a courtyard, Sullivan, Kuo et al. 2004), the programs we uncovered during the course of writing this paper involve more active participation in gardening, hunting, nature adventure, and related activities. This participation among veterans and community members includes initiating programs (e.g., a community gardening or hunting program for veterans), serving as a guide or leader for others engaged in hunting, fishing, agriculture, and other nature-based activities, as well as partaking of the nature based activity itself. Below we describe a sample of these programs drawing on our own experiences and on information compiled from program websites and informal interviews. These efforts are recent; thus for many of them we have only limited information and controlled studies are lacking. However, the fact that veterans, including those with PTSD and war injuries, are initiating many of these programs and that participants cite benefits, suggest their value in helping some veterans, families and communities to deal with the deployment cycle.

<B> Gardening

<C> Defiant Gardens: 4-H Military Families Program[8]

4-H, a youth development organization associated with land-grant universities and Cooperative Extension in the US, has teamed up with the Department of Defense to conduct programs for

[8] http://www.news.cornell.edu/stories/June09/DefiantGardens.html

military children and their families, a number of which include gardening (e.g., at Fort Irwin Army Base[9], Port Heuneme Naval Base[10]). One such community gardening program taking place at Fort Drum Army Base and neighboring communities in New York State, seeks to link youth with soldiers overseas by planting seeds grown in Afghanistan in the US, and by sending containerized gardening systems to deployed soldiers so that they can garden while awaiting active assignment. By engaging children and soldiers in a common activity that they can share with each other during phone calls and through email, the ***Defiant Gardens*** program hopes to address a persistent problem in military families, i.e., how to foster positive communication among children in the US with parents who are deployed soldiers overseas. The program is expanding to encompass additional environmental stewardship or "civic ecology" activities (Krasny and Tidball 2010), including riverbank restoration and tree planting, and hopes to leverage existing informal and formal networks (e.g., the Hearts Apart group of Army spouses, Trout Unlimited). A related research project is measuring changes in sense of place and social capital among youth as a result of participation.

<C> Go Grow Green Community Gardening[11]

At Peterson Air Force Base in Colorado, the Health and Wellness Center launched the *Go Grow Green* community initiative to encourage military families to spend time together. It includes adopt-a-plant, adopt-a-plot, and gardening programs for adults and children, a Community Supported Agriculture initiative, and incentives at a farmers market to promote local food consumption.

<C> Gardening at Veterans Administration Hospitals and Other Treatment Centers[12]

Two veterans started a gardening program at the Veterans Affairs Medical Center near Newark, New Jersey. According to a veteran with PTSD, who started his own landscaping company as a result of his experience,

> *When I got here I was completely isolated. But being with the plants gives me time to think and meditate, to feel the soil or clay or whatever you're working in. I talk to my plants. Maybe it's crazy, but it's given me a chance to get out, work with others, grow something and do something that's right, not just for myself, but for the whole community.*[13]

This program, which is part of a larger effort on the part of the Veterans Administration to offer more holistic health care, offers veterans an opportunity to befriend other veterans suffering similar problems. According to a newspaper article about the program,

> *For many of the veterans, the experience has been less about growing food and more about learning about themselves. So Mr. Mourning has felt a special kinship with Josh Urban, a 30-year-old Iraq and Afghanistan veteran who also suffers from post-traumatic stress disorder. He*

[9] http://groups.ucanr.org/freeadmin/impact/impactview.cfm?impactnum=705
[10] http://www.vcstar.com/news/2009/aug/03/military-base-kids-enjoy-coaxing-food-from/
[11] http://www.peterson.af.mil/news/story.asp?id=123147734
[12] http://www.nytimes.com/2009/11/30/nyregion/30towns.html?_r=1&emc=eta1
[13] http://www.nytimes.com/2009/11/30/nyregion/30towns.html?_r=1&emc=eta1

> *had also found himself isolated, unable to fully reintegrate into the world outside the war zone, until tilling the soil with his fellow veterans helped him make his peace with life back home.*[14]

<C> *Gardening Leave, UK*[15]

Gardening Leave seeks to enhance the therapeutic experience of ex-military personnel with combat-related mental health problems in the UK. Activities include maintaining the National Poppy Collection, planting and growing flowers and vegetables, making plant and bird boxes, and fishing classes initiated by veterans. Participants in the program reported gaining a sense of purpose; feeling they had something to anticipate; feeling relaxed, secure and safe; learning new skills; being part of growing something; being somewhere where problems are understood; and being able to share knowledge and skills with others (Atkinson 2009).

<B> Farming

<C> *Farmer-Veteran Coalition*[16]

The Farmer-Veteran Coalition in California seeks to identify "employment, training, and places to heal on America's farms" for veterans who may be dealing with drug, alcohol or other behavioral problems that may make traditional employment difficult, and those who have suffered physical or brain injury and need vocational rehabilitation. The Coalition also supports projects such as Veterans Village, Operation Recovery, and Veteran Victory Farm that work to integrate housing and farming with emotional and spiritual guidance for veterans.

<C> *Archi's Acres*[17]

Archi's Acres is a 3-acre, high-tech organic farm owned by an Iraq War veteran who is trying to help other combat veterans "shake the trauma of war by turning swords to plowshares." Whereas about 20 U.S. Department of Veterans Affairs centers have gardening programs, Archi's Acres may be the only commercial agricultural enterprise directed toward veterans. UCLA psychiatry professor C. Scott Saunders, who specializes in treating PTSD among combat veterans, commented: "How much better can one feel about themselves than if you can make a meal out of things that you grew?"[18]

<B> Green Jobs

<C> *Veterans Green Jobs*[19]

Veterans Green Jobs trains veterans to work in all aspects of the green economy, from forest fire management, to planting urban trees, to improving energy efficiency. It builds on the special skills of veterans, including team work, the ability to persevere under extreme situations, and dedication to a cause. Although the program is focused first on jobs and only marginally on nature as a therapeutic environment, testimony from a participant engaged in a trail building assignment suggests the emotional importance of work experiences in nature.

> *Upon completion of the 2009 season, I've received six certifications, six months of critical job experience, over $2,000 in AmeriCorps College Awards, and invaluable*

[14] http://www.nytimes.com/2009/11/30/nyregion/30towns.html?_r=1&emc=eta1
[15] http://www.gardeningleave.org/index.php/digging-for-victory-gardening-helps-former-soldiers-with-stress
[16] http://www.farmvetco.org/?page_id=172
[17] http://www.fresnobee.com/559/story/1753378.html?storylink=mirelated
[18] http://www.fresnobee.com/559/story/1753378.html?storylink=mirelated
[19] http://veteransgreenjobs.org/

> *experiences, relationships and personal growth. The therapy of wilderness also works in ways that would only be diminished were I to attempt to articulate further. However, I believe the transformative and healing properties I witnessed of the space which we held, will never be lost or forgotten.*

<*B*> Hunting

<*C*> *Liberty Lodge Outfitting*[20]

Started by a wounded Iraq War veteran, Liberty Lodge Outfitting is a non-profit group that seeks to promote emotional and physical rehabilitation of veterans and their families through hunting and other outdoor activities at its 650-acre camp in rural New York State. The director draws on his childhood outdoor experiences in describing his motivation and inspiration: "*I can remember when my dad would take us out and teach us the types of trees that were around… It's not about killing. It's about being together, remembering the good times*."[21] A participant in the program writes:

> *On November 17, 2009 I was invited to the Liberty Lodge Outfitters in upstate New York for a hunting trip where there was only the guarantee of a good time. Not only was it a good time, but, the hunt of a lifetime. Didn't get the chance to harvest the buck of a lifetime, but I sure got a chance to watch him coming down the mountain like he owned the whole mountain side. Never did get him to come in close enough to shoot, but close enough to watch with a post card background. It was unbelievable. This is just one of the many memories of my week long hunting trip. One good time of many. Amy's good cooking. JT's humor. And Kevin and Brandon trying to out think the deer. Gregg never did say much, other than for me to remember where I was at.*[22]

<*C*> *Ducks Unlimited*

Two prior servicemen in Seneca Falls, New York, have initiated the "SF for SF -- Seneca Falls Ducks Unlimited for Special Forces" concept as a way to encourage Special Forces soldiers on leave to enjoy a waterfowl hunt at almost no cost and with little preparation. According to one of the program organizers, this local effort of a major conservation organization demonstrates the "*importance of time spent outdoors in pursuit of recreation, in fellowship with like-minded people, and in familiar places with special significance -- especially for men and women in service to our country who are under immense stress and pressure.*"[23]

<*B*> Fishing

<*C*> *Mission of Healing on the Rogue*[24]

The nonprofit Wounded Warrior Project is dedicated to helping severely injured veterans get on with their lives. Their partnership with Trout Unlimited, a local veteran, and fishing lodge operators along the Rogue River in Oregon resulted in the "*Mission of healing on the Rogue: Wounded Iraq War vets spend four days on the river, where harsh memories fade into the scenery."* Participating veterans include those with leg and arm amputations and PTSD. Their comments suggest the value of overcoming the physical challenges of walking along rocky riverbed terrain and catching and landing large fish, as well as the camaraderie that comes from spending time outdoors with veterans who have faced similar challenges. According to one

[20] http://www.libertylodgeoutfitters.com/index.html
[21] http://www.libertylodgeoutfitters.com/IJ_article_1_.pdf
[22] http://www.libertylodgeoutfitters.com/index.html
[23] Keith Tidball, personal communication

participant, getting outdoors with others who have survived combat helps them all "work it out." "*It doesn't matter whether you can see the wound or not … We were all in this together … In the military, we slept in the dirt and the sand. To come out here with these great guys on the Rogue and catch these fish . . . oh, man. We're getting memories of a lifetime."*

<*C*> *Project Healing Waters*[25]

Project Healing Waters Fly Fishing for wounded veterans was started by a retired Navy Captain, and has since spread to chapters across the US. The volunteers go to the veteran's hospitals to teach fly casting and fly tying on a long-term basis, in addition to guiding veterans on fly fishing expeditions. According to the project website, "*For many participants, particularly disabled veterans, the socialization and camaraderie of the classes are just as important as the fishing outings.*" Whereas each program must include at a minimum a local military hospital and a fly fishing club, the program in Oswego County New York (home of Fort Drum Army Base) is a partnership of the New York State Department of Environmental Conservation, a volunteer fishing guide and numerous other local volunteers, charter boat captains, a Veteran's Administration Hospital, and a wealth of conservation, veterans, and health service organizations. According to the leader for the Oswego County program,

> *I volunteered to become the Oswego County Chapter Coordinator because I've always had a special place in my heart for our vets. Project Healing Waters is a win-win situation for everyone. The biggest winners are the veterans and soldiers, then the people and community who volunteer their time and support the program.*"

<*B*> Retreats and Camps

<*C*> *Coming Home Project*[26]

Through the Coming Home Project, a multidisciplinary team of veterans, family members, psychotherapists and interfaith leaders offer free, confidential group support and stress management retreats for Iraq and Afghanistan veterans and families. Participants share experiences and stories, struggles and breakthroughs; learn new skills for reducing stress and anxiety and enhancing well-being; improve communication and relationships; and enjoy invigorating outdoor recreational activities in scenic, peaceful settings.

<*C*> *Operation Purple*[27]

Operation Purple offers free camp programs for military children and their families to help them develop and maintain healthy and connected relationships. Campers participate in hiking, canoeing, and beach explorations, as well as structured activities that highlight areas of strength and resilience in the family. An initial evaluation of this program has focused on the military and leadership aspects but has not addressed the nature related components (Chandra, Burns et al. 2008).

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[24] http://www.tu.org/press-room/tu-in-the-news-archive/tu-chapter-news/mission-of-healing-on-the-rogue

[25] http://www.projecthealingwaters.org/index.html; http://www.co.oswego.ny.us/info/news/2008/110708-1.html

[26] http://www.cominghomeproject.net/retreats

[27] http://www.militaryfamily.org/our-programs/operation-purple/

<*B*> Outdoor Adventure

***<C> Outward Bound*[28]**

Unlike the more recent initiatives mentioned above, for over 20 years Outward Bound has offered wilderness expeditions specifically designed for war veterans at no cost to participants. Goals include helping veterans build a supportive community with other war veterans, facilitating discussions on readjustment and transition challenges, and re-energizing and reinvigorating veterans' spirits with adventures and challenges in the outdoors.

<C> ***Glencree Sustainable Peace Project***[29]

Glencree Centre for Peace and Reconciliation is a non-governmental organisation that is devoted to peace-building and reconciliation in Ireland and other countries. In partnership with the Wilderness Leadership School, which has experience using wilderness to bring together South African ex-combatants, Glencree created the "Ex-combatants Programme" in 2001, which in 2005 grew into the Glencree Sustainable Peace Project. Former enemies from both sides of the Irish conflict, including combatants and prisoners as well as women and children, hike through the South African wilderness together, crossing crocodile infested rivers, sleeping on the ground, and protecting each other while on guard duty against dangerous animals. Quotes from the participants testify to the role of this wilderness experience in creating community among former foes.

> *And then he started telling me about his own life…my whole mind started to change…seeing beyond the banners…beyond the flags…beyond the uniforms…I started to see the human being.*
>
> *What I found most challenging was meeting and sharing time with people that I hated and despised as ignorant, wicked, cruel and evil…I was surprised at how quickly I adapted to many members of the group. I was very skeptical about certain people and was profoundly moved by the method used to get us to use the 'third space' (wild nature) to share the 'things', attitudes, values, whatever that we had in common.*
>
> *Seeing the human side is very difficult…they were perceived as enemies, but were also human beings; it was human beings you were killing, it is human beings who are grieving, that's hard to see…that's a big mountain to climb.*

<A> Synthesis and Moving Forward

The use of nature for both therapeutic and civic purposes in times of war is rooted in history (see chapters by Lawson and Geisler, this volume). The recent support by Veteran's Administration hospitals and other arms of the US Department of Defense in community gardening and fishing programs suggests an initial recognition of the potential for nature-based activities to help in the healing process for soldiers. However, based on our review of the research literature, nature-based activities have not been considered in research on interventions that foster resilience and adaptation in military communities (Bowen, Martin et al. 2000; Bowen, Martin et al. 2001; Bowen, Mancini et al. 2003; Drummet, Coleman et al. 2003; Huebner, Mancini et al. 2009), and

[28] http://www.outwardbound.org/index.cfm/do/cp.veterans

[29] http://www.glencree.ie/site/sustainable.htm; http://www.glencree.ie/site/documents/Glencree_A1.pdf

are only minimally addressed in the research literature on individual resilience among veterans (Hyer, Boyd et al. 1996). This is despite research-based evidence of the positive impacts of engagement with nature on community and individual well-being in non-military settings (Ulrich 1983; Ulrich 1984; Kuo, Bacaicoa et al. 1998; Kuo, Sullivan et al. 1998; Austin and Kaplan 2003; Sullivan, Kuo et al. 2004; Kaplan and Kaplan 2005; Tidball, Krasny et al. 2010); numerous accounts by veterans and civilians in war settings about the importance of gardening to emotional and psychological survival (Helphand 2006); and the recent emergence of nature-based efforts, many of which are initiated by veterans, that use gardening, hunting, fishing, outdoor adventure, and other forms of nature contact and stewardship to foster recovery and resilience among veterans and their families.

Focusing on post-disaster rather than more narrowly on war-impacted communities, Norris et al. (2008) proposed a set of factors that foster community resilience, two of which bear similarities to the community capacity factors proposed for promoting adaptations and well-being in military communities (Bowen, Mancini et al. 2003; Huebner, Mancini et al. 2009). According to Norris et al. (2008, 127): "Community resilience emerges from four primary sets of adaptive capacities -- Economic Development, Social Capital, Information and Communication, and Community Competence -- that together provide a strategy for disaster readiness." More specifically, these authors describe the importance of social capital, including social support, informal ties, citizen participation, sense of community, and attachment to place; and community competence described as "the networked equivalent of human agency," which encompasses "collective action and decision-making, capacities that may stem from collective efficacy and empowerment" (Norris, Stevens et al. 2008, 141). They go on to suggest five principles for post-disaster interventions to promote community resilience, including engaging local people in planning and implementing interventions, mobilizing pre-existing formal organizational networks and informal relationships, and bolstering existing social supports.

The work of Kaplan, Kuo, Tidball, and others cited earlier has demonstrated the potential for nature based interventions, including those involving active engagement of community members such as community gardening and community forestry, to address these social factors integral to community resilience. For example, many of the programs described in this chapter are based on volunteerism, including by hunting and fishing guides who take veterans into the outdoors (many of whom are veterans themselves), and by soldiers suffering from PTSD who plant gardens at Veterans Administration hospitals. Volunteerism among veterans and other members of the community are demonstrations of shared responsibility for the general welfare of the community, and of collective competence that takes advantage of opportunities for addressing community needs and for confronting situations that threaten the well-being of community members, as outlined in the military community capacity model of Huebner et al. (2009). These programs also often entail extensive partnerships with non-profit and government conservation, health, and community organizations, and thus represent a means of building networks that foster community capacity in military (Bowen, Martin et al. 2000; Bowen, Mancini et al. 2003) and post-disaster communities (Norris, Stevens et al. 2008). Thus, although many of the nature-based interventions are positioned within an individual therapeutic model of resilience, they include elements known to build community capacity, and thus have the potential to contribute to resilience at the level of broader military communities.

Further, even though many existing programs focus on nature-based "healing," testimony reported in the program descriptions above indicates an awareness of the importance of the camaraderie formed among ex-combatants (e.g., Glencree Sustainable Peace Project, Healing the Waters Fly Fishing) and between soldiers and their families (e.g., Defiant Gardens). A quote from the Liberty Lodge website illustrates how nature and social connectedness can be integrated in such programs: *"Not all wounds are physical, and nothing heals better than mother nature, friendship and time away."*[30] Connections formed on course may foster the informal networks that play a role in community capacity (Bowen, Mancini et al. 2003).

Our own experience with the Defiant Gardens program near Fort Drum Army Base is illustrative of some of the challenges and potential ways of moving forward with nature-based interventions designed to build resilience in military communities. In designing the program, we recognized the potential for community gardening to connect children with older community members (Krasny and Tidball 2009), and with parents who were deployed yet had the opportunity to garden on base. However, the Fort Drum community in which we worked lacked a history of community gardening, and our attempts during the first year to engage formal networks such as veterans groups or local museums met with mixed success. Part way through the first year of the program, we realized that there were other networks, e.g., of military spouses, already engaged in gardening and other nature activities that promote social connectedness. We plan to explore the potential to engage individuals in such networks and activities in planning Defiant Gardens activities in subsequent years, paying particular attention to how nature-based activities might provide opportunities to build community capacity including a shared sense of responsibility and collective competence. We have adapted existing research instruments to measure factors such as social capital and place attachment for the audiences with whom we are working, and intend to examine these and other outcomes (e.g., sense of community, ecosystem services) of this civic ecology program, which seeks to foster not only community but also local ecosystem resilience (Tidball and Krasny 2007).

Not surprisingly, the above discussion leaves many questions unanswered. How do we balance the need for "time away" or solitude that might allow veterans to experience the healing power of nature, with the need for interventions that build on existing community assets and foster informal networking, a sense of shared responsibility, and collective action? How do nature-based interventions compare to other types of interventions aimed at building community capacity? How might the unique combination of civic volunteerism and the restorative effects of nature that are evident in community gardening and other civic ecology programs play a role in building community capacity? How can we design research that will test the propositions we put forth about integrating nature-based interventions with existing efforts to foster community capacity and sense of community? And finally, how might we develop a typology of nature-based activities, including programs that emphasize reflection in nature, training and skill building, overcoming physical challenges, and volunteer stewardship? In spite or perhaps in light of these questions, we hope that this chapter will stimulate discussion about ways to connect the nature-based initiatives that are emerging across the US and in the UK with more established efforts to foster resilience in communities impacted by deployment.

[30] http://www.libertylodgeoutfitters.com/index.html

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Literature Cited

Atkinson, J. (2009). An evaluation of the Gardening Leave project for ex-military personnel with PTSD and other combat related mental health problems. Glasgow, UK, The Pears Foundation**:** 6.

Austin, M. E. and R. Kaplan (2003). Identity, involvement, and expertise in the inner city: Some benefits of tree-planting projects. Identity and the Natural Environment: the Psychological Significance of Nature. S. Clayton and S. Opotow. Cambridge, MA, USA, The MIT Press**:** 205-225.

Bonanno, G. A. (2004). "Loss, trauma, and human resilience: How we have underestimated the human capacity to thrive after extremely aversive events." American Psychologist **59**(1): 20-28.

Bowen, G. L., J. A. Mancini, et al. (2003). "Promoting adaptation of military families:an empirical test of a community practice model." Family Relations **52**(1): 33-44.

Bowen, G. L., J. A. Martin, et al. (2000). "Community capacity: Antecedents and consequences." Journal of Community Practice **8**(2): 1-22.

Bowen, G. L., J. A. Martin, et al. (2001). "Civic engagement and sense of community in the military." Journal of Community Practice **2001**(2): 71-93.

Campbell, L. and A. Wiesen, Eds. (2009). Restorative commons: Creating health and well-being through urban landscapes. Newtown Square, PA, USA, US Forest Service, Northern Research Station.

Chandra, A., R. M. Burns, et al. (2008). Understanding the Impact of Deployment on Children and Families: Findings from a Pilot Study of Operation Purple Camp Participants. Rand Health Working Papers. Santa Monica, CA, Rand Center for Military Health Policy Research**:** 69

Chandra, A., S. Lara-Cinisomo, et al. (2009). "Children on the homefront: the experience of children from military families." Pediatrics **10.1542/peds.2009-1180**.

Department of Defense. (2009). "Army releases September suicide data." Retrieved 9 December 2009, from http://www.defense.gov/releases/release.aspx?releaseid=13033.

Dingfelder, S. F. (2009). "The military's war on stigma." Monitor on Psychology **40**(6): 52.

Drummet, A. R., M. Coleman, et al. (2003). "Military families under stress: Implications for family life education." Family Relations **52**(3): 279-287.

Helphand, K. (2006). Defiant Gardens: Making Gardens in Wartime. San Antonio, TX, Trinity University Press.

Hewson, M. (2001). "Horticultural Therapy and Post Traumatic Stress Recovery." Journal of Therapeutic Horticulture **12**.

Hoge, C. W., C. A. Castro, et al. (2004). "Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care." New England Journal of Medicine **351**(1): 13-22.

Huebner, A. J., J. A. Mancini, et al. (2009). "Shadowed by war: Building community capacity to support military families." Family Relations **58**: 216-228.

Hyer, L., S. Boyd, et al. (1996). "Effects of Outward Bound experience as an adjunct to inpatient PTSD treatment of war veterans." Journal of Clinical Psychology **52**(3): 263-278.

Kaplan, R. and S. Kaplan (1989). The Experience of Nature: A Psychological Perspective. Cambridge, UK, Cambridge University Press.

Kaplan, R. and S. Kaplan (2005). Preference, restoration, and meaningful action in the context of nearby nature. Urban place: Reconnecting with the natural world. P. F. Barlett. Cambridge, MA, USA, The MIT Press**:** 271-298.

Kaplan, S. and R. Kaplan (2001). "Health, supportive environments, and the reasonable person model." American Journal of Public Health **93**(9): 1484-1489.

Kaplan, S. and C. Peterson (1993). "Health and Environment: A Psyschological Analysis." Landscape and Urban Planning **26**: 17-23.

Krasny, M. E. and K. G. Tidball (2009). "Community gardens as contexts for science, stewardship, and civic action learning." Cities and the Environment **2**(1): 8.

Krasny, M. E. and K. G. Tidball (2010). "Civic Ecology: Linking Social and Ecological Approaches in Extension." Journal of Extension **February 2010**.

Kuo, F. E., M. Bacaicoa, et al. (1998). "Transforming inner-city landscapes: Trees, sense of safety, and preference." Environment and Behavior **30**: 28-59.

Kuo, F. E. and W. Sullivan (2001). "Environment and crime in the inner city: Does vegetation reduce crime?" Environment and Behavior **33**: 343-367.

Kuo, F. E., W. C. Sullivan, et al. (1998). "Fertile ground for community: Inner-city neighborhood common spaces." American Journal of Community Psychology **26**(6): 823-855.

Lester, P., K. Peterson, et al. (2010). "The long war and parental combat deployment: Effects on miltiary children and at-home spouses." Journal of the American Academy of Adolescent and Child Psychiatry **49**(4): 310-320.

Luthar, S. S., D. Cicchetti, et al. (2000). "The contruct of resilience: a critical evaluation and guidelines for future work." Child Development **71**(3): 543-562.

MacDermid, S., M, R. Samper, et al. (2008). Understanding and promoting resilience in military families. West Lafayette, IN, USA, Military Family Research Institute**:** 28.

Manos, G. H. (2010). "War and the military family." Journal of the American Academy of Adolescent and Child Psychiatry **49**(4): 297-299.

Miavitz, E. M. (1998). "Grief Gardening." Journal of Therapeutic Horticulture **9**.

Miles, I., W. Sullivan, et al. (1998). "Ecological restoration volunteers: the benefits of participation." Urban Ecosystems **2**: 27-41.

Norris, F. H., S. P. Stevens, et al. (2008). "Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness." American Journal of Community Psychology **41**: 127-150.

Novotney, A. (2009). "Strong in mind and body." Monitor on Psychology **40**(11): 40.

Ryan, R. L. and R. E. Grese (2005). Urban volunteers and the environment: Forest and prairie restoration. Urban Place: Reconnecting to the Natural World P. F. Barlett. Cambridge, MA, USA, MIT Press**:** 173-188.

Sullivan, W., F. Kuo, et al. (2004). "The fruit of urban nature: Vital neighborhood spaces." Environment and Behavior **36**(5): 678-700.

Tanielian, T. and J. H. Jaycox (2008). Invisible wounds of war: Psychological and cognitive injuries, their consquences, and services to assist recovery. Santa Monica, CA, RAND Corporation**:** 492.

Ternus, M. (2009). Military Women's Perceptions of the Effect of Deployment on their Role as Mothers and on Adolescents' Health. Mason Gazette. M. Musick. Fairfax, VA, USA, George Mason University.

Tidball, K. G., M. Krasny, et al. (2010). "Stewardship, Learning, and Memory in Disaster Resilience." Environmental Education Research.

Tidball, K. G. and M. E. Krasny (2007). From risk to resilience: What role for community greening and civic ecology in cities? . Social Learning Towards a more Sustainable World. A. E. J. Wals. Wagengingen, The Netherlands, Wagengingen Academic Press**:** 149-164.

Ulrich, R. S. (1983). Aesthetic and affective response to natural environment Behavior and the Natural Environment I. Altman and J. F. Wohlwill. New York, Plenum**:** 85-125.

Ulrich, R. S. (1984). "View through a window may influence recovery from surgery." Science **224**: 420-421.

Wong, L. and S. Gerras (2010). The effect of multiple deployments on army adolescents. Carlisle, PA, USA, Strategic Studies Institute**:** 39.

Zoroya, G. (2009). Troops' kids feel war toll. USA Today. Washington, DC.

GREENING IN THE RED ZONE:
Disaster, Resilience, and Community Greening

Keith G Tidball & Marianne Krasny, editors

A Springer publication - expected late 2010

Rationale and scope
Access to green space and the act of creating green spaces is well understood to promote human health, especially in therapeutic contexts among individuals suffering traumatic events. Less well understood, though currently being studied, is the role of access to green space and the act of creating and caring for it in promoting neighborhood health and well being as related to social-ecological system resilience. An important implication of this work lies in specific instances of greening and the presence of greened spaces in promoting and enhancing recovery, and perhaps resilience, in social-ecological systems disrupted or perturbed by violent conflict or other catastrophic disaster. This edited volume will provide illustration and interpretation of these phenomena through a series of cases or examples of "Greening in the Red Zone," which will explore how access to green space and the act of creating green spaces in extreme situations might contribute to resistance, recovery, and resilience of social-ecological systems.

Approximate length: 450 pages (20 5000 word chapters + foreword, introduction, and index)

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