

Research Project: Social, Psychological and Cultural Benefits of Large Natural Habitat & Wilderness Experience

A review of current literature for the Wilderness Foundation

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Key findings

- For this review of wilderness experience literature, for The Wilderness Foundations, the University of Essex identified 209 potential references. After a screening process on the basis of relevance, robustness and availability, 70 papers were entered onto a database for further investigation. The majority of publications are publications in peer reviewed journals with approximately 50% dated between 2000 and 2007.
- The studies were further categorised by methodological type, namely whether they undertook quantitative or qualitative research or a mixture of both; whether the studies were largely descriptive (categorised as 'writing') or based on a modelling approach. The majority of studies fell into the 'writing' (49%) and qualitative research (33%) categories with only 10% of studies undertaking quantitative research. Most of the studies that we examined used more than one method of collecting data about the participants in the wilderness programmes and on the effects of that wilderness experience on them, the most frequently used being personal knowledge and insight (34%), questionnaires (30%) and interviews (22%). All of the quantitative studies used some kind of questionnaire and 14% also used some kind of participant journal. Qualitative studies tend to use more of a variety of different methods but 50% used questionnaire and 50% used interview data with 23% using focus groups and participant journals.
- Approximately half of the papers specified the measures used to determine outcomes of the wilderness experiences and these measures varied, including standardised, validated quantitative measures such as the Youth Outcomes Questionnaire; standardised and well-recognised qualitative techniques such as NUD-IST; various self-designed descriptive qualitative measures and various self-designed quantitative measures. These measures considered a wide variety of parameters and outcomes including: family functioning, locus of control, self-concept, self-esteem, interpersonal/psychological functioning, alcohol and drug history, connection to wilderness, mood and perceptions of competence. Of those studies where data was given (in just under half of the studies examined) 19% have a control group in the study and 81% do not.
- The majority of the published literature studied (83%) is based on wilderness experiences located in the US. Where details of the wilderness typology were given, 25% featured wilderness experiences in designated wilderness areas, 20% in forests and 15% in desert regions. The minimum time spent in the wilderness was half a day and the maximum exposure time was 70 days which makes the average exposure time for all of the studies just over 3 weeks spent in the wilderness.
- In 19% of the studies, the remit for exposure to wilderness was purely as an 'experience', in 26% the wilderness experience was more of a therapeutic intervention for a particular group of people in need and 55% of studies were largely literature reviews or studies concerned with furthering research in the field of wilderness therapy, which we have categorised as 'writings'. All of the quantitative studies were interventions; qualitative studies contained 52% experiential and 35% interventions and in studies where both methodologies were used, 67% were interventions and 33% were experiential
- Nine key activity groups were specified in the literature reviewed with the most frequently undertaken being backpacking (22%), camping (18%) and outward bound (17%). Other activities included: arts and crafts, indoor activities, therapy session, journal writing, solo

time and group activities. Most frequently, participants acquire hard skills (48%) or a mixture of both soft and hard skills (30%) as a result of their wilderness experience.

- Although numbers of participants varied widely, most of the wilderness programmes studied involved between 11-50 participants. The majority of wilderness experiences in the research (66%) had both male and female participants, although 17% catered for men only and the same amount were female only wilderness excursions. The age of participants also varied from 8 to 78 but over half (52%) of the studies ran wilderness experiences for adolescents.
- Participants in the studies reviewed fall into 5 main cohort types: i) youth at risk (i.e. pre-court system); ii) Adjudicated youth (i.e. in the court system); iii) those people with drug or alcohol problems (in this review, this group is mainly adolescents); iv) people needing remedial healthcare (mainly as a result of mental health problems or stress) and v) members of the general public. Half of the wilderness experiences examined were for the general population, 17% for people suffering from drug or alcohol misuse problems and 17% for people needing remedial healthcare.
- Most frequently the quantitative studies concentrated on younger people with drug and alcohol abuse problems (44%); over half of qualitative studies (54%) examine wilderness experiences mainly with the general population; mixed methods studies focus on younger people with drug and alcohol problems (67%) and the literature reviews and descriptive studies concentrate on wilderness experiences involving the general public (57%)
- A myriad of different benefits to participants were specified by the studies reviewed, some of these have been measured by quantitative methods, others by qualitative methods and still others described anecdotally, depending on the individual wilderness context. However we sorted the outcomes specified in the studies into 10 main categories: i) changes to health and sense of self; ii) behaviour change; iii) changes in feelings of connection to nature; iv) changes in family relationships; v) changes in relationships with others (social aspects); vi) educational changes; vii) changes in spiritual aspects; viii) cultural changes; ix) economical changes and x) 'other' changes.
- Health benefits reported included improvements both to physical and mental health parameters. Overall improvements in participants' physical health included cardiovascular improvements, reduced fat in body mass, increased bone and muscle mass, increased physical fitness, reduced anxiety and stress, reduced sleep disturbances and hypertension. In terms of mental health and well-being, studies reported positive changes in self-esteem, self-confidence, self-determination, increased self-efficacy, self-image, greater sense of self-control and self-empowerment.
- Positive effects on participant behaviour, particularly relevant for cohorts such as 'youth at risk', 'adjudicated youth' and 'disaffected young people', included the 'desire to change' anti-social behaviours and the development of positive behaviours. Social changes included an improvement in communication between participants and the wider society, resulting in improved interpersonal and family relationships, the development of trust and increased social capital.
- Feelings of connectedness to nature and changes in attitudes to nature have been widely reported in the studies reviewed, ranging from the aesthetic appreciation of beautiful scenery and landscapes to a deep sense of belonging to the natural world. In addition, participants often reported an increase in spiritual values, an awareness of a spiritual dimension and a development of a sense of place.

- Educational benefits reported focus on knowledge and skills acquisition, be that of hard, practical wilderness skills (camp, survival, trekking skills etc) or soft, interpersonal and communication skills or coping strategies. Also several of the studies reviewed in this research project reported economic outcomes including both direct and indirect economic benefits such as the revenue produced by organisation of wilderness trips and ecotourism (direct) or reduced costs to the wider society from changes in participant behaviours.
- The evidence base for the benefits of wilderness experiences is continually growing; however the majority of studies into the effects of a wilderness experience are purely qualitative or descriptive with much emphasis on anecdotal evidence. There is an increasing recognition that outcomes need to be quantified to provide further support of the beneficial effects, but only 14% of studies reviewed, included a quantitative element in the research and of these studies, many had methodological limitations such as small sample sizes (i.e. below 30 people) and no control group. There is also a lack of longitudinal studies and many studies do not administer follow-up measures to evaluate the long-term effects of wilderness programme participation.
- There is a real need for further research to address these limitations and key recommendations include studies which: i) use a mixed method approach; ii) use robust methodologies, with larger participant numbers and with repeated assessment measures; iii) have a control; iv) include a follow-up element; and v) directly test how effective wilderness therapy is in changing behaviour across multiple programmes of different length, with different leadership experience, and targeting different cohorts.

1. Introduction

1.1 Rationale for the project

An emergent body of evidence demonstrates the health and well-being benefits experienced by individuals after spending time in the natural environment, and this link between nature and health is becoming more recognised in current literature.

Health benefits seen as a result of contact with nature include reduced stress levels¹; improved mood²; enhanced psychological wellbeing³ and improved attention and concentration⁴. Natural places facilitate stress recovery, encourage exercise participation, stimulate development in children and provide opportunities for personal development and sense of purpose in adults⁵. Contact with nature also enables social contact (and so builds social capital⁶) and the creation of memories of place⁷.

The psychological value of open spaces in particular has long been acknowledged⁸ and since John Muir and Henry David Thoreau wrote about the benefits of spending time in the American wilderness in the 19th century (leading to the establishment of the first national parks), wilderness experiences have been recognised as being beneficial for learning respect for both other people and nature, allowing time for reflection, getting to know oneself better and learning not to take things for granted⁹. Furthermore this has led to the development of therapeutic interventions for a variety of different people which are based on facilitated wilderness experiences, such as wilderness therapy, outdoor behavioural therapy and adventure therapy.

With wild landscape under increasing threat there is an urgent need to demonstrate how wilderness and large natural habitat areas can deliver sound 'social' benefits. There have been a myriad of different studies examining the benefits resulting from wilderness experiences (many of which are outlined in more detail in Peacock et al 2008) and so the Wilderness Foundation UK has commissioned the University of Essex to conduct an initial literature based research programme to identify all existing work that reflects the benefits of wilderness/nature based experience. It is felt that this will help to reinforce the case for protection and restoration of wilderness areas, as well as underpinning fund raising requests for the development of future Wilderness Foundation initiatives.

1.2 Aims of the project

The aims of this study are therefore:

- To identify the social, personal, cultural, and health related benefits of wilderness experience
- To draw on quantified benefits wherever possible
- To identify areas for further research and draft specifications for these

¹ Hartig *et al.*, 2003; Gullone, 2000; Rubinstein, 1997; Ulrich *et al.*, 1991; Parsons, 1991; Lohr *et al.*, 1996; Laumann *et al.*, 2003; Parsons *et al.*, 1998; Fredrickson & Branigan, 2005

² Hartig *et al.*, 2003; Rubinstein, 1997; Hartig *et al.*, 1996; Ulrich *et al.*, 1991; Hartig *et al.*, 1991; Van den Berg *et al.*, 2003

³ Kaplan, 1995; Kaplan, 1992; Kaplan & Kaplan, 1989; Hartig *et al.*, 1991

⁴ Lohr *et al.*, 1996; Hartig *et al.*, 2003; Hartig *et al.*, 1991; Van den Berg *et al.*, 2003; Tennessen & Cimprich, 1995; Wells, 2000; Taylor *et al.*, 2001; Taylor *et al.*, 2002; Laumann *et al.*, 2003; Kuo, 2001

⁵ Health Council of the Netherlands, 2004

⁶ Coley *et al.*, 1997; Kuo *et al.*, 1998; Kweon *et al.*, 1998

⁷ Peacock et al 2008

⁸ Jackson, 1979; Taylor, 1979; Altman & Zube, 1989; Rubinstein, 1997

⁹ Russell *et al.*, 1998

2. Methodology

A comprehensive search was undertaken to identify potential references on the quantification of the benefits derived from wilderness experiences.

Researchers used the following search engines to generate references:

- Web of knowledge
- Google scholar
- Education Resources Information Centre (ERIC)

Researchers also searched the following websites for publications:

- Aldo Leopold Wilderness Research Institute
- University of Idaho Wilderness & Protected Area Research Centre (WPARC)
- Wilderness Therapy Treatment Programmes: www.wildernesstherapy.org
- The Outdoor Behaviour research Co-operative: www.obhrc.org

The key words used to search for references included: wilderness and health /cultural /social /personal benefits; wilderness therapy; wilderness experience; wilderness recreation; wilderness adventure; nature therapy; value of wilderness; benefits of wilderness etc.

There was a primary focus on obtaining published papers which have been peer reviewed as they have more credence. However, books, book chapters, published reports and conference proceedings were also included.

A cover sheet was designed (see Appendix A) and completed for each individual reference to capture the key details, such as: typology of wilderness; country; cohort; number of participants; exposure time; wilderness activities; context (e.g. intervention, experience, writing); methods (e.g. quantitative, qualitative (anecdotal, testimonial etc)); measures; presence of control group; reported outcomes (health, social, cultural, economic, other); etc.

All of the cover sheet information was entered into a large database so that there is an accessible summary of all the key data, which can be regularly updated over time. This will be used for both quantitative and qualitative analyses. The database will also feed into a secondary database, which codes the studies based on keyword information categories – e.g. forested area; US; young offenders; 47; 30 male; 17 female; etc. - which allows both descriptive and statistical analyses to be performed (e.g. 70% of papers have involved adolescents; 75% report improvements in self-esteem etc). This process will also help to identify any emerging key themes in the literature.

3. Results from the literature review

3.1 About the studies reviewed

This section provides details of the studies reviewed in this research, including:

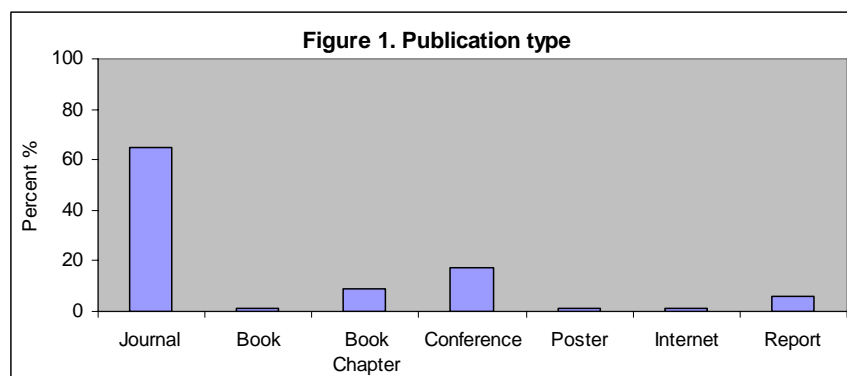
- Types of publication
- Dates published
- Method category
- Number of wilderness programmes included in each study
- Data sources and outcome measures
- Presence of a control

The search engine process generated 209 potential references of which 70 were entered onto a database for further investigation. The remaining 139 were excluded either on the basis of their abstract as not being a) relevant or b) scientifically robust; because the data referred to had already been included in other papers already examined or because the full papers were unavailable. The majority of papers fall into one of the following categories – literature review, meta-analysis, experimental intervention; comparative analyses (e.g. comparing programmes); subjective evaluation based on author opinions/experience; or proposed models.

3.1.1 Types and dates of publication

The majority of publications included in this literature review are publications in peer reviewed journals, although other studies included are book chapters and published conference proceedings. Other publication types and the proportions of studies that fall into each category are shown in Figure 1.

The publication dates of the studies included in this research varied from the earliest paper from 1972, to the most recent in 2007. Approximately 50% of the papers were dated before 2000 and 50% after 2000.



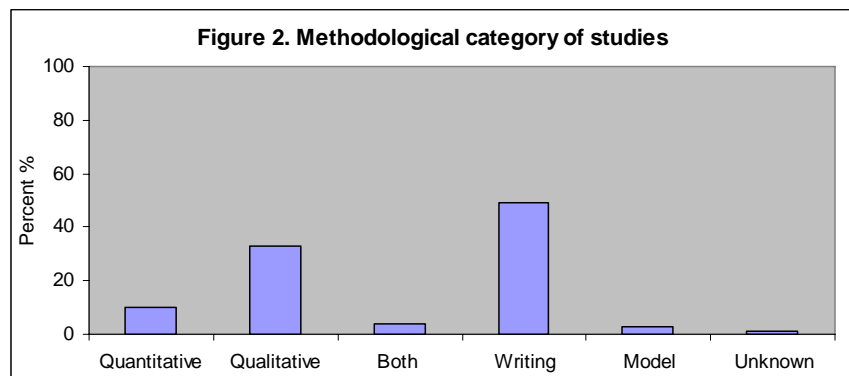
3.1.2 Methodological category

The studies were further categorised by methodological type, namely whether they undertook quantitative or qualitative research or a mixture of both; whether the studies were largely descriptive (categorised as 'writing') or based on a modelling approach (see Table 1 for a more detailed description). The majority of studies fell into the 'writing' (49%) and qualitative research (33%) categories with only 7 studies (10%) undertaking quantitative research (see Figure 2)

Table 1. Description of methodological categories

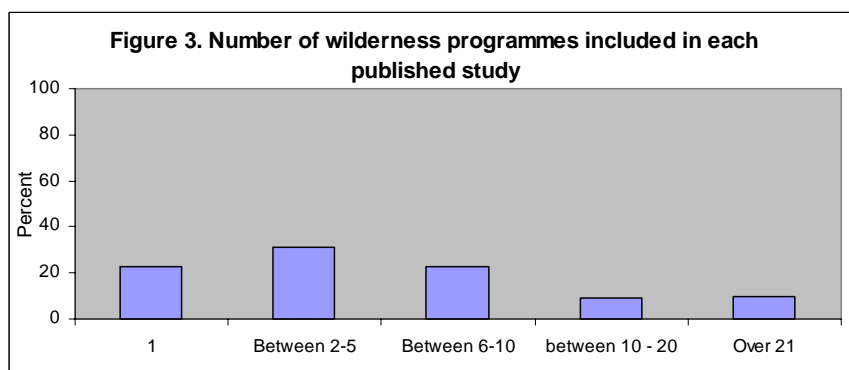
Methodological Type	Details
Qualitative analysis	<ul style="list-style-type: none"> • Anecdotal • Testimonial • Formal qualitative procedures - e.g. content analysis or delphi technique
Quantitative analysis	<ul style="list-style-type: none"> • Experimental/quasi experimental - treatment and control group compared • Comparative analysis - data on 2 or more types of programmes compared and analysed • Internal comparison - treatment group only (no control) but may include comparison of pre-experience/post experience data on a series of 3 or more tests given over time
Writing	<ul style="list-style-type: none"> • Programme evaluation /descriptive - relies on description, anecdotes, examples etc. • Subjective evaluation - based on author opinions, impressions and/or personal experience • Evaluation of research or knowledge - evaluates methods, quality or conclusions of research done about a given subject
Model	<ul style="list-style-type: none"> • Proposed model or explanation - proposed model to explain an observed phenomenon

Studies which utilised quantitative, qualitative, both quantitative and qualitative or modelling methods were more likely to be peer-reviewed journal papers than the more descriptive studies: Quantitative studies - 86% journals; qualitative - 70%; both - 67%; model - 100% compared to 'writing' with 53% journals, 21% conference proceedings and 14% books.



3.1.3 Number of wilderness programmes included in each published study

The papers reviewed in this study varied in the number of individual wilderness experience programmes used for the research. Some



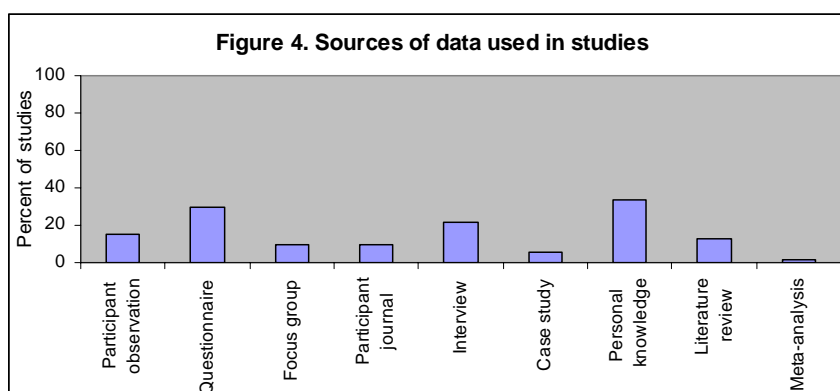
studies were based on the minimum of one group of participants experiencing one trip to the wilderness, others examined several groups of people on several trips to the wilderness and other studies represented the results of a significant number of wilderness programmes, with the maximum number for one study of 130 programmes. However the majority of studies

represented results from between 2 and 10 programmes (more details can be found in Figure 3). The total number of wilderness programmes included in all of the literature reviewed was 370.

3.1.4 Data sources and outcome measures used in the studies

Most of the studies that we examined used more than one method of collecting data about the participants in the wilderness programmes and on the effects of that wilderness experience on them.

Such methods included questionnaires, interviews (both structured and semi-structured), participant generated (self-reports, participants journals, self reported behaviour and reflections), participant observations, case studies and focus



groups. Other studies did not involve direct research with participants on wilderness experiences, but instead were descriptive papers based on individual experience, study, ideas and insight; reviews of literature or meta-analysis studies. The most frequently used methods were personal knowledge (34%), questionnaires (30%) and interviews (22%), as shown in Figure 4.

Table 2. Percentage of studies in each methodological category using different data sources

Methodological category	Type of data source for study								
	Direct research – with participants						Indirect research		
	Participant observation	Questionnaire	Focus group	Participant journal	Interview	Case study	Personal knowledge	Literature review	Meta-analysis
Quantitative	0	100	0	14	0	0	0	0	0
Qualitative	32	50	23	23	50	14	5	0	0
Quantitative and Qualitative	33	67	33	0	67	0	0	0	0
Writing	6	0	3	3	6	3	64	24	3
Model	0	0	0	0	0	0	50	50	0

Note: Percentages may total more than 100 as studies could feature several data sources

Perhaps unsurprisingly, as Table 2 shows, all of the quantitative studies used some kind of questionnaire and 14% also used some kind of participant journal. Qualitative studies tend to use more of a variety of different methods but 50% used questionnaire and 50% used interview data with 23% using focus groups and participant journals. The majority of the

descriptive studies categorised as 'writing' (64%) were based on personal knowledge and insights and the 50% of the modelling studies relied on data from personal knowledge and 50% from reviews of literature.

34 studies (49%) specified the measures used to determine outcomes of the wilderness experiences. These measures varied, including standardised, validated quantitative measures such as the Youth Outcomes Questionnaire; standardised and well-recognised qualitative techniques such as NUD-IST; various self-designed descriptive qualitative measures and various self-designed quantitative measures. More details of the measures and sampling techniques used in the wilderness experiences studied can be found in Table 3.

Table 3. Measures and techniques used in the wilderness experience studies reviewed

Type of measure or technique	Measure or technique (where specified in studies reviewed)
Quantitative measures used - (standardised, validated and well-recognised)	<ul style="list-style-type: none"> • Youth Outcomes Questionnaire (Y-OQ) (6%) • Parental assessment version of Y-OQ, SRY-OQ • Adolescent Attachment Questionnaire (AAQ) • Inventory of Parent and Peer Attachment (IPPA) • Minnesota Multiphasic Personality Inventory (MMPI) • Personal Experience Inventory (PEI) • Family Assessment Measure III (FAM III) • self description questionnaire III (SDQ) • The Symptom Checklist SCL-90 • Brief Symptom Inventory (BSI) • Behavioural symptom Inventory • Hamilton depression and anxiety scales (HRSD) and (HAS) • Rotter locus of control scale (6%) • State-trait anxiety scale (STAI) • General self-efficacy scale (GSE) (6%) • Multidimensional-Multiattribubtional Causality Scale (MMCS) • Piers-Harris Children's Self-Concept Scale • Coopersmith Self-Esteem Inventory (CSEI) • Sphere-specific measures of perceived control • PTSD Mississippi scale (M-PTSD) • Impact of events scale (EIS) • Various unspecified, but standardized 'participation in self-help programmes' measures
Qualitative techniques used	<ul style="list-style-type: none"> • Non numerical Unstructured Data Indexing, Searching and Theorising (NUD-IST) (12%) • open and patterned coding; • analysis of reflective journals • Action Research
Sampling methods used	<ul style="list-style-type: none"> • Experience sampling method' ESM (9%) • phenomenological inquiry method (6%)

Note: Percentages show proportion of studies using measure, where frequency is more than 1.

Both the standardised and self-designed measures utilised in the studies measured a wide variety of parameters and outcomes, which include:

- family functioning
- locus of control
- self-concept
- self-esteem
- mood
- perceptions of competence
- stress arousal
- confidence in problem solving

- frequency of negative thoughts
- emotional intensity
- interpersonal/psychological functioning
- alcohol and drug history
- chemical use
- chemical dependency
- craving.
- arrest history
- school related problems
- SES
- social stability
- education curricula
- wilderness experiences
- living conditions
- mode of environmental experience
- task orientation
- environment awareness
- feelings of connection to wilderness
- peacefulness,
- recollection,
- wilderness setting
- impact of spiritual activities
- previous experience in outdoor activities
- risk scales;
- degree of socialness
- Ethnographic factors

3.1.5 Presence of a control

The studies were examined for the presence of a control group in their research. A control group ensures that any changes observed in an experimental group are due solely to the experience or intervention (i.e. in this case some way of comparing outcomes for those taking part in the wilderness experience with those who are not). Of those studies where data is given (in just under half of the studies examined) 19% have a control group in the study, 81% do not. In terms of methodological category of studies, 50% of the quantitative studies have a control compared to 13% of qualitative studies and 33% of studies featuring both quantitative and qualitative methods.

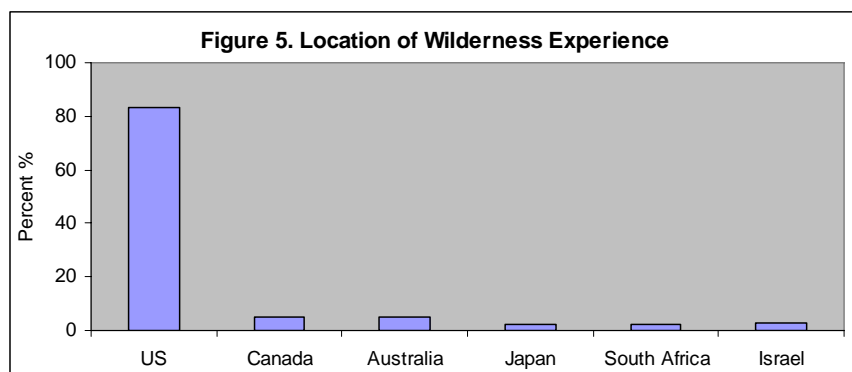
3.2 About the Wilderness Experience

This section provides details of the wilderness experiences featured in the studies reviewed in this research, including:

- Location and type of wilderness
- Context of wilderness experience
- Length of time spent in the wilderness
- Activities undertaken in the wilderness
- Type of skills learned by participants

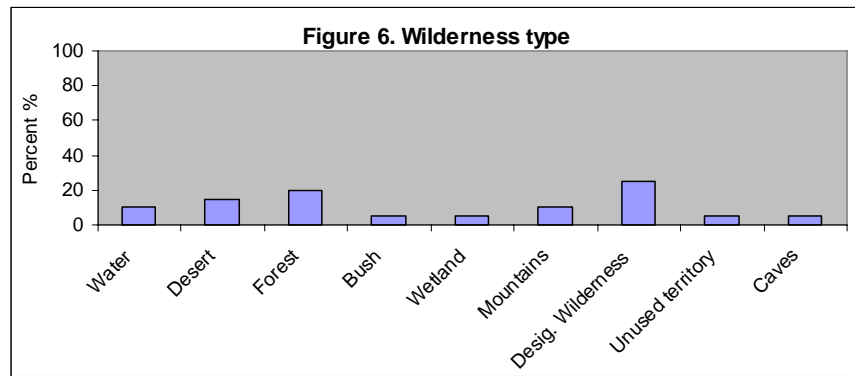
3.2.1 Location and type of wilderness

The majority of the published literature in this field seems to originate from wilderness experiences in the US, certainly in this review, 83% of studies were based on wilderness areas in the US with 5% of studies in Canada and Australia



alike (see Figure 5).

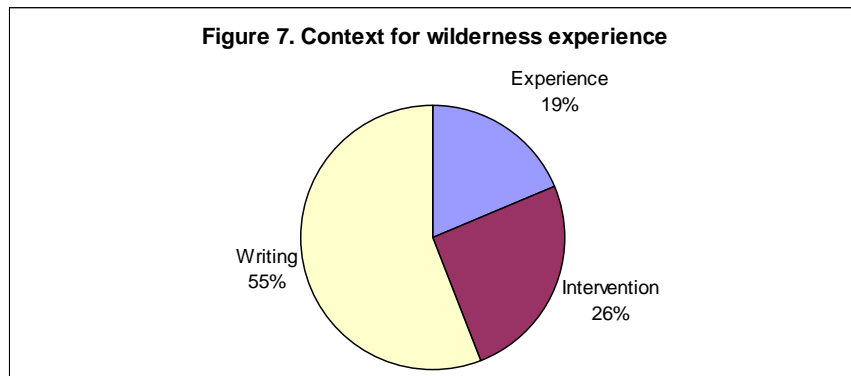
Of the 20 studies where details of the wilderness typology were given, 5 (25%) featured wilderness experiences in designated wilderness areas, 4 (20%) in forests and 3 (15%) in desert locations. More details of the types of wilderness are shown in Figure 6.



When the type of wilderness is compared between the studies in the various method categories, quantitative studies feature experiences on water (25%) and in desert, forest and cave locations. More of the qualitative studies took place in forests (25%), designated wilderness (25%) and mountains (17%) than in the other wilderness types and all of the studies which used a mixture of quantitative and qualitative methods took place in designated wilderness. A third of the descriptive studies categorised as 'writing' took place in each of deserts, designated wilderness and unused territory.

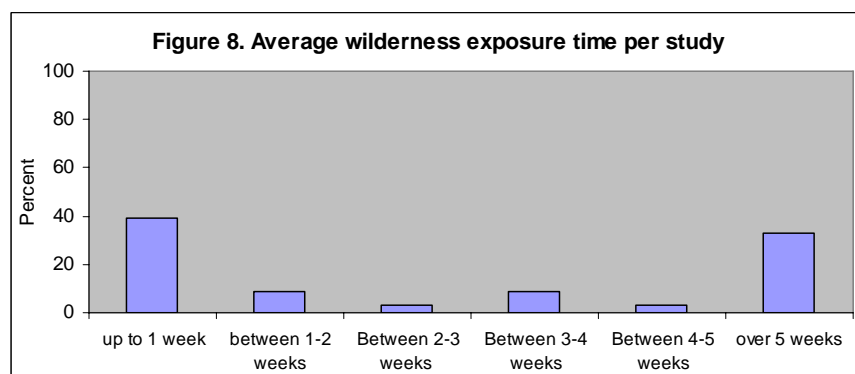
3.2.2 Context of wilderness experience

Studies reviewed in this research self-specified into 3 main contexts. Two of the contexts are based on direct participant contact: i) where the remit for exposure to wilderness was purely as an 'experience' (19%) and ii) where the wilderness experience was more of a therapeutic intervention for a particular group of people in need (26%). There was another category of studies which were largely literature reviews or studies concerned with furthering research in the field of wilderness therapy and we have called these studies 'writings' (55%). Figure 7 shows the proportion of studies falling into the 3 contexts.



All of the quantitative studies were interventions; qualitative studies contained 52% experiential and 35% interventions and in studies where both methodologies were used, 67% were interventions and 33% were experiential.

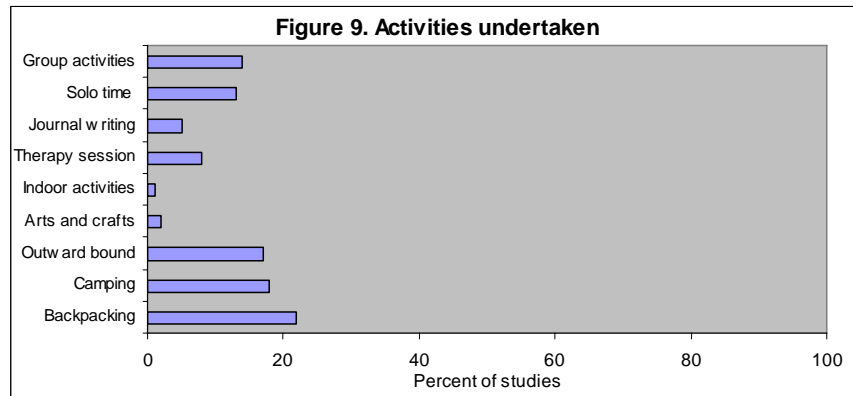
3.2.3 Length of time spent in the wilderness



The length of time that participants spent in the wilderness areas during each of the individual programmes varied greatly between studies. The minimum time spent in the wilderness was half a day and the maximum exposure time was 70 days which makes the average exposure time for all of the studies just over 3 weeks spent in the wilderness. However the averages exposure times between studies varied greatly so the average wilderness exposure times per study were calculated and are represented in Figure 8.

3.2.4 Activities undertaken and skills learnt in the wilderness

There was a great deal of variety in the types of activities undertaken in the wilderness experiences studied but 9 key activity groups were specified in the literature reviewed with the most frequently undertaken being backpacking (22%), camping (18%) and outward bound (17%).

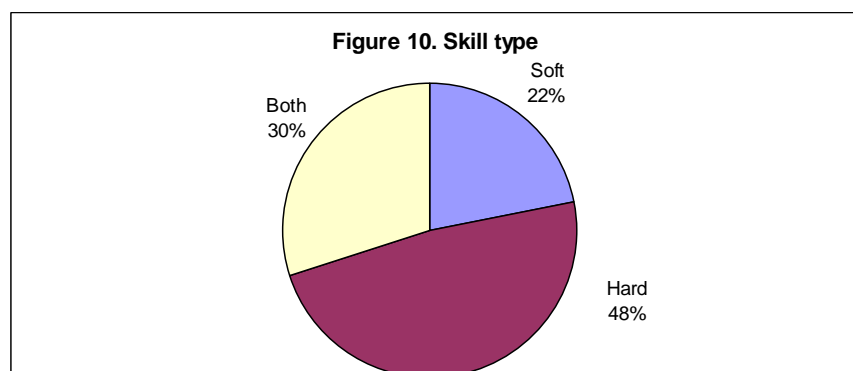


The proportion of studies undertaking the 9 key activities are shown in Figure 9 and details of which activities we have included in the 9 key categories are highlighted in Table 4.

Table 4. Activities included in key activity type

Key activity type	Activities included in category
Backpacking	Backpacking, hiking,
Camping	Camping out, camp skills, camp cooking, building a home in nature, survival skills
Outward bound	Canoeing, rock climbing, white-water rafting, orienteering, snowshoeing, cross country skiing, sea kayaking
Arts and crafts	Various arts and craft activities, dream-catcher making
Indoor activities	Various
Therapy session	Individual therapy with trained counsellor, group therapy, family therapy, cognitive behavioural relapse prevention programme, traditional 12 step addiction recovery activities
Journal writing	Journal writing, letter writing to absent parents
Solo time	Solo time camping in the wilderness, day, overnight, solo reflection time
Group activities	Discussion time, trust and teambuilding exercises, spiritual group activities, scavenger hunts, rites of passage experiences

Quantitative studies tended to concentrate more on group activities, backpacking, and camping and therapy sessions. Qualitative studies featured backpacking, camping and group/solo time whereas studies using both a quantitative and a qualitative approach concentrate more on backpacking, outward bound and solo time. A further breakdown of activities undertaken in studies with different methodological approaches can be found in Table 5.



The wilderness experiences and activities in the literature have also been examined in terms of the type of skills learnt by participants. In wilderness therapy these skills are termed either as 'soft' or 'hard' skills. Soft skills are skills such as personal reflection, journaling, solitude and responsibility; whereas hard skills include heavier duty activities involving practical skills and outward bound activities for example. Most frequently in the studies reviewed participants acquire hard skills (48%) or a mixture of both soft and hard (30%) – see Figure 10.

Table 5. Percentage of studies involving various types of activity by methodological category

Methodological category	Type of activity undertaken on Wilderness experience								
	Back-packing	Camping and camp skills	Outward bound type activities	Therapy sessions	Journal writing	Solo time	Group activities/ Team building	Arts and crafts	Other indoor activities
Quantitative	43	29	43	43	29	43	57	0	0
Qualitative	44	30	17	9	9	22	22	0	0
Quantitative and Qualitative	67	33	67	33	0	67	33	0	0
Writing	9	14	15	3	0	3	6	6	3

Note: Percentages may total more than 100 as studies could feature several activities

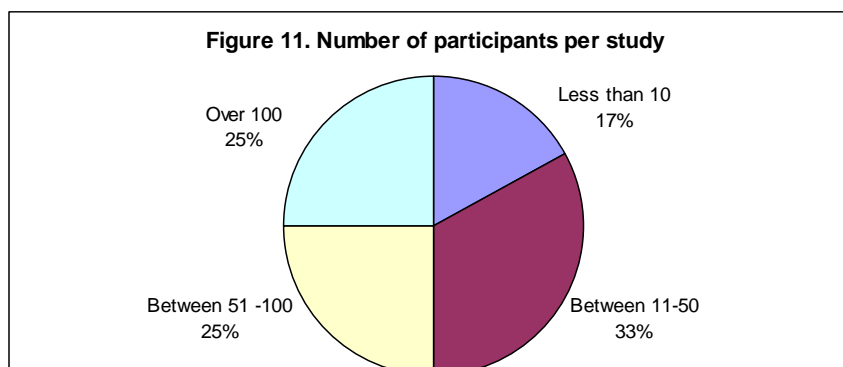
3.3 About the participants in the studies

This section provides details of the participants taking part in the studies reviewed in this research, including:

- Number of participants
- Age of participants
- Gender of participants
- Cohort groups and descriptions

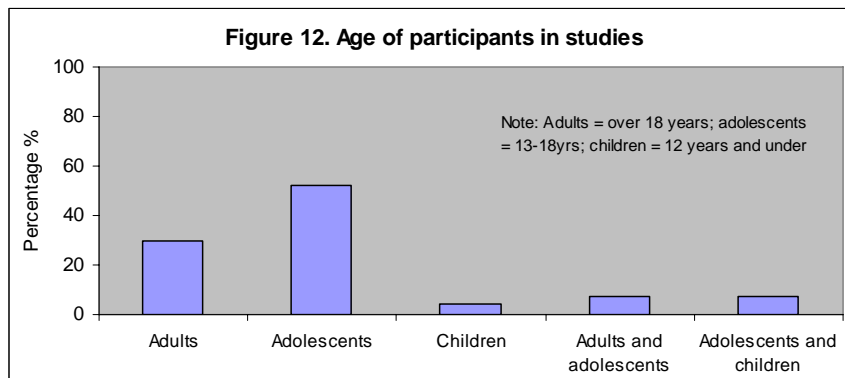
3.3.1 Number of participants per study

Over half of the studies reviewed specified the number of participants that took part in the research. The minimum number of participants taking part in a research study was 6 and the maximum number was 10,000. Most frequently however studies involved between 11-50 participants although 3 studies had a very large number of participants (over 800) - see Figure 11 for more details.

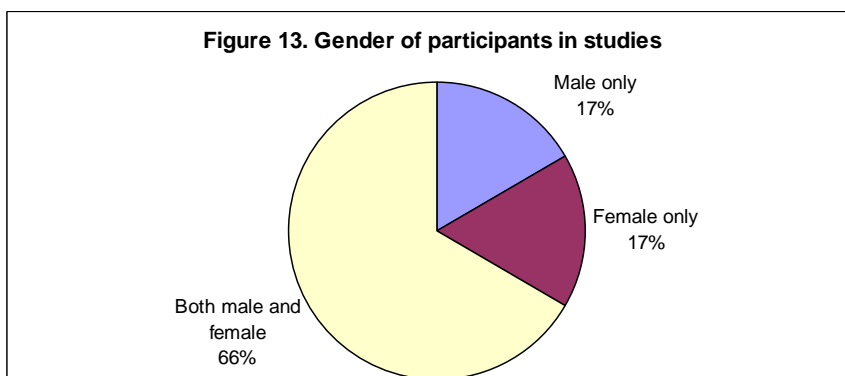


3.3.2 Age and gender of participants

The age of participants taking part in the wilderness experiences in the studies reviewed, varied from a minimum age of 8 years old to the oldest at 78 years. However over half (52%) of studies ran wilderness experiences for adolescents (see Figure 12).

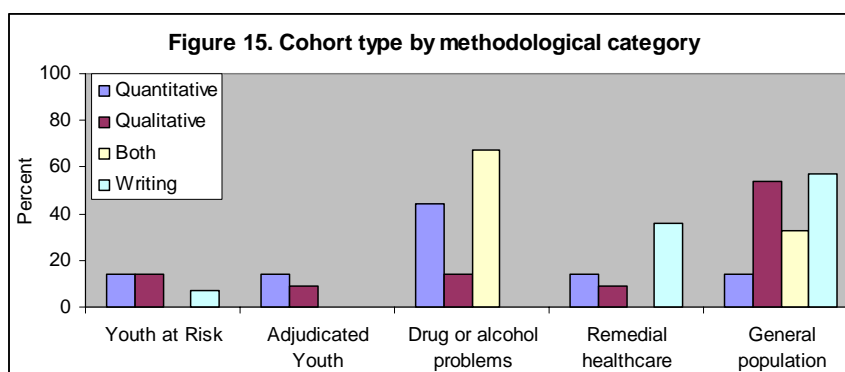
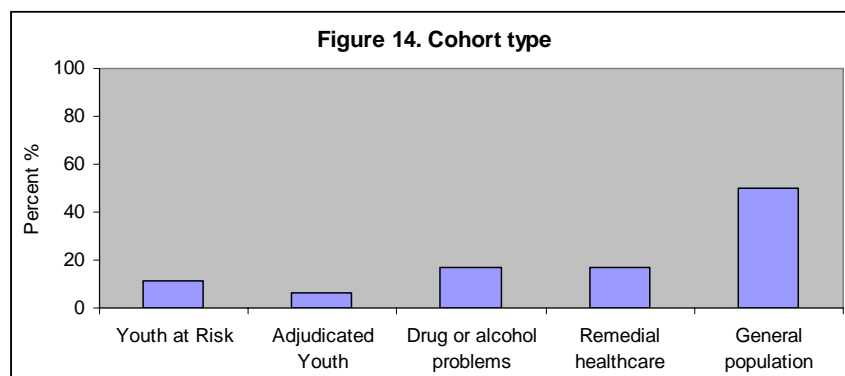


The majority of wilderness experiences in the research (66%) had both male and female participants, although 17% catered for men only and the same amount were female only wilderness excursions (Figure 13).



3.3.3 Cohort groups and descriptions

As section 3.2.2 shows, some of the wilderness trips have been experiences for members of the general population of all ages and others have been designed as interventions for specific groups of people (cohorts). Generally speaking, all of the participants in the studies reviewed fall into 5 main cohort types: i) youth at risk (i.e. pre-court system); ii) Adjudicated youth (i.e. in the court system); iii) those people with drug or alcohol problems (in this review, this group is mainly adolescents); iv) people needing remedial healthcare (mainly as a result of mental health problems or stress) and v) members of the general public. Half of the wilderness experiences examined were for the



general population, 17% for people suffering from drug or alcohol misuse problems and 17% for people needing remedial healthcare. See Figure 14 for more details on proportion of studies catering for various cohort types.

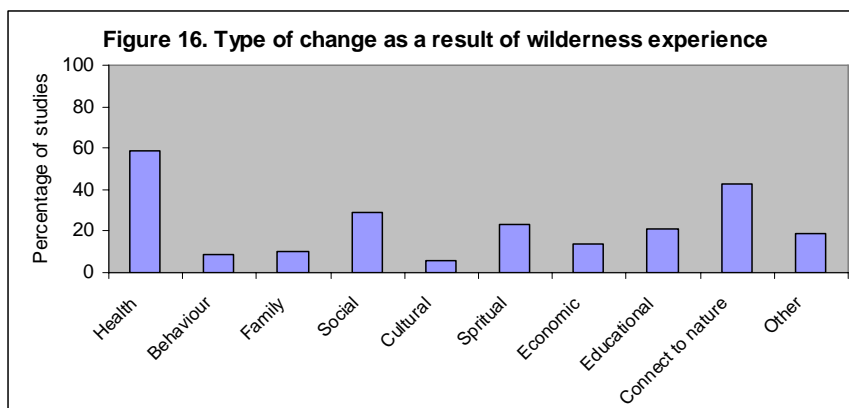
Most frequently the quantitative studies concentrated on younger people with drug and alcohol abuse problems (44%); over half of qualitative studies (54%) examine wilderness experiences mainly with the general population; mixed methods studies focus on younger people with drug and alcohol problems (67%) and the literature reviews and descriptive studies concentrate on wilderness experiences involving the general public (57%) – see Figure 15.

3.4 About the outcomes of wilderness experiences

This section provides details of the outcomes for participants resulting from wilderness experiences as reported in the studies reviewed in this research. These include those relating to:

- Health and sense of self
- Behaviour change
- Connection to nature
- Family and Social aspects
- Educational aspects
- Spiritual aspects
- Cultural aspects
- Economic aspects

A myriad of different benefits to participants were specified by the studies reviewed, some of these have been measured by quantitative methods, others by qualitative methods and still others described anecdotally, depending on the individual wilderness context. However we sorted the outcomes specified in the studies into 10 main categories: i) changes to health and sense of self; ii) behaviour change; iii) changes in feelings of connection to nature; iv) changes in family relationships; v) changes in relationships with others (social aspects); vi) educational changes; vii) changes in spiritual aspects; viii) cultural changes; ix)



economical changes and x) 'other' changes. All of these main categories are further explained in sections 3.4.1 to 3.4.8 and proportions of studied who reported changes in particular categories are shown in Figure 16.

In order to identify gaps in the evidence base and to help shape future research, the types of reported outcome were further examined by methodological category (as highlighted in Table 6) and by skills type (Figure 17). The quantitative studies reported changes in participant health (86%) and behaviour (42%); the qualitative studies saw changes in health (70%), connection to nature (65%) and social changes (56%); all studies which used a mix of quantitative and qualitative methods reported educational changes and changes in health

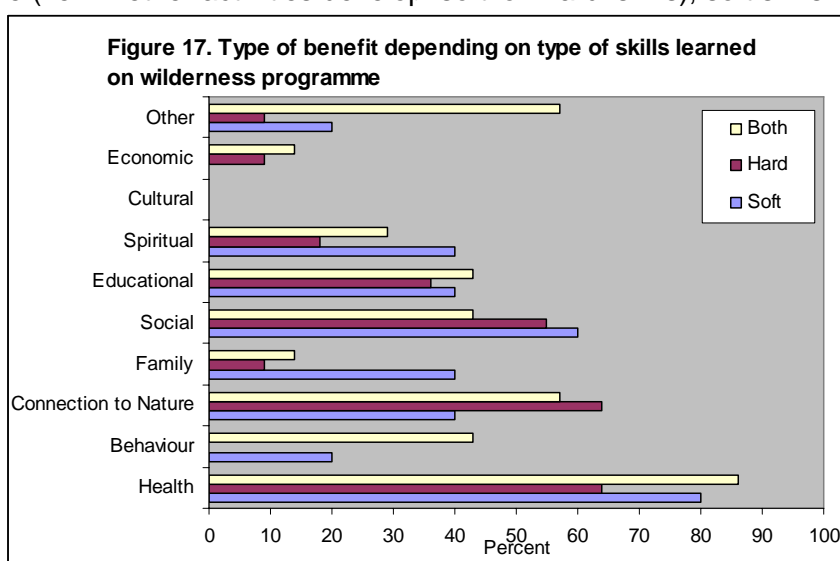
(67%) and to economic factors (67%); literature review type studies focused on changes to health (44%) and connection to nature (35%) and all the modelling studies reported changes in health.

Table 6. Types of reported outcome by methodological category (as a Percentage of studies)

Methodological category	Type of outcome									
	Health	Behaviour	Connection to Nature	Family	Social	Educational	Spiritual	Cultural	Economic	Other
Quantitative	86	42	29	29	0	0	0	0	0	43
Qualitative	70	13	65	13	56	30	35	4	17	26
Quantitative and Qualitative Writing	67	0	0	33	33	100	0	0	67	0
Model	44	0	35	3	9	12	24	9	9	9
Model	100	0	50	0	50	50	0	0	0	50

Note: Percentages may total more than 100 as studies could feature several types of outcome simultaneously

When benefits from a wilderness programme were examined depending on the type of skills learned on the programme (i.e. whether activities develop 'soft' or 'hard' skills), soft skills resulted in 80% of studies deriving health benefits and 60% social benefits; hard skills had health benefits (64%), improvements in connectedness to nature (64%) and social benefits (55%); and where programmes developed both soft and hard skills, improvements were found in health (84%) and connection to nature (57%).



Studies could of course result in benefits from several of the categories simultaneously, the minimum number of benefit categories reported was 1 and the maximum was 7. 23% of the studies reported benefits in just one category, 63% between 2-5 and 14% 5 or over.

3.4.1 Health and sense of self

There were many health benefits reported, improvements both to physical and mental health parameters. Studies reported overall improvements in participants' physical health as a

result of wilderness activities, including cardiovascular improvements, reduced fat in body mass, increased bone and muscle mass, increased physical fitness, reduced anxiety and stress, reduced sleep disturbances and hypertension. In terms of mental health and well-being, studies reported positive changes in self-esteem, self-confidence, self-determination, increased self-efficacy, self-image, greater sense of self-control and self-empowerment.

Other reported health and well-being benefits and changes to participants' sense of self are shown in Box 1.

Box 1. Additional reported health and well-being benefits resulting from a wilderness experience

- | | |
|---|---|
| <ul style="list-style-type: none"> • a development of self • learnt how to access and express emotions, • desire to discontinue drugs and alcohol; • Significant decrease for all types of prior diagnoses (behaviour/substance/mood disorders); therefore significant increase in wellbeing • enhanced image of self • feel and look better physically • drugs and alcohol under control, • increased sense of control over lives. • reduced pathological symptoms; • mood improvements • evidence of enduring changes in self-esteem | <ul style="list-style-type: none"> • one year post treatment - 47% patients had maintained complete abstinence from alcohol and other drug use • patients - happier, able to cope better, physical health improved, more positive general attitude • adolescents ratings of self-concept increased • more in control of their behaviour and depression. • reduced anxiety and self-esteem. • helped them control their anger, settled them down, • increased sense of competence, increased mastery, increased self-esteem • significant increase in self-efficacy and self-esteem. |
|---|---|

3.4.2 Behaviour change

Studies also reported positive effects on participant behaviour, which is particularly relevant for cohorts such as 'youth at risk', 'adjudicated youth' and 'disaffected young people'. Such reported behaviour changes largely concentrate on the 'desire to change' anti-social behaviours and the development of positive behaviours. Such behaviour changes are outlined in Box 2.

Box 2. Behavioural improvements reported after a wilderness experience

- | |
|---|
| <ul style="list-style-type: none"> • observed change in behaviour • desire to change behaviour; • desire to be 'a better person' - e.g. respect others, • be a positive role model for siblings and friends, help family out more, be more open minded and listen to others; • significant decrease in behavioural symptoms - client self-reports decreased by 21.59, parent assessments reduced by 51.95 (<13 is recognised as significant decrease in symptoms). Decreases across all sub-scores for both client and parent assessment - interpersonal distress, somatic, interpersonal relations, critical items, social problems and behavioural dysfunction • parent ratings of problem behaviour improved for both groups; • parent and adolescent reports of police and court contacts reduced • realisations to change behaviour (actions affect others, make amends, more appreciative, opportunity to reflect, realisations to change, see problems differently, see other perspective, understand priorities, willing to change, avoid negative influences) • significant change in behavioural symptom inventory; changes in individual treatment plan goals, • willingness to cooperate all positive (increase in affective and cooperative ratings most prominent) • increased social adjustment and reduced recidivism. • Significant decrease in arrests and school related problems compared to year before treatment (64% at intake to 19% one year follow up) |
|---|

3.4.3 Connection to nature

Wilderness experiences have historically been associated with feelings of connectedness to nature and changes in feelings towards nature have been widely reported in the studies reviewed in this paper. These feelings of nature range from the aesthetic appreciation of beautiful scenery and landscapes to a deep sense of belonging to the natural world. Reported nature focused outcomes from wilderness experiences are highlighted in Box 3.

Box 3. Reported nature focused outcomes from a wilderness experience

<ul style="list-style-type: none"> • Fascination - concepts included feeling of being overwhelmed and fascinated by the forest, belief that the experience was caused by the forest • acute awareness of feelings in body and mind and description of the environment as complex, full of variety and change; • Appreciation of the physical environment, wild game, flora, birds and weather conditions • Identifies 10 values of wilderness: 1) historical; 2) recreational; 3) ecosystem integrity; 4) environmental; 5) landscape; 6) scientific; 7) spiritual; 8) traditional use (e.g. hunting, fishing, camping etc); 9) intellectual; 10) economic. • Alaskan perception of wilderness - place to use, and explore, not a place to be left alone. • Acknowledge extraordinary scenic beauty of landscape and place a high value on aesthetics • Increased awareness/appreciation for the natural environment, sense of belonging to natural setting. • oneness with nature, and a caring relationship with nature. • Wilderness setting - provides opportunity to escape from daily routine and focus on spiritual environment generated intrigue, reflection, awe and wonder, sense of vulnerability • finding personal meaning through engaging with the natural environment • working with the renewing environment to reconnect personal strength and hope • awareness of surroundings; timelessness • Aesthetic and artistic values; peace values • Nature and sense of self (healing effect of nature) • nature tranquillity - remember wilderness as peaceful and relaxed; • Naturalness and solitude were important in gaining development of self, development of community and spiritual development. • Natural awe and beauty (connectedness to nature) • importance of being in bona fide wilderness 	<ul style="list-style-type: none"> • Changes how you see yourself - more humble, humans are part of nature, not separate; sense of identity, caring more for the environment; climbing has taught him how he can develop a relatedness to nature as a close friend and ultimately part of himself • Attuning to, opening to and entering wilderness (intention, sacred attitude and alone/solo-time) e.g. sense of simplicity, immerse oneself in nature, less need for control, reduced mind chatter, general slowing down, being in the moment, relaxing, getting in tune with nature etc. • openness with nature (feeling at home, free, safe, part of nature, communication with nature i.e. animals, plants and terrain, self expansion, reluctance to return to the cultural/built world etc. • Nature relieves tensions and pent up hostilities • Wilderness/nature (comments regarding wilderness, feelings directly invoked by wilderness and respect for wilderness. v) healthy environment ; xi) wilderness and environmental awareness • Why wilderness? vast open spaces; vulnerable humbling (wilderness creates a sense of vulnerability which is humbling) • nature perceptions - physical characteristics of natural environment, amazement, appreciation, timelessness, immersion, mystery, affordance and threat, solitude, oneness with nature • manifestations of wilderness rapture - e.g. self awareness, self-actualisation, feelings of awe, oneness, wonder, humility and appreciate of illusion of human control over nature, sense of comfort in connection with nature, increased consideration of others, more openness and affability, appreciation of simplicity and ability to live in the present moment, feeling of renewal and vigour, being more mindful and focused. • Continued feeling of connection to wilderness even after one year. • development of environmental consciousness
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3.4.4 Interpersonal changes - Social and Family

Wilderness experiences have been shown to improve communication between participants and the wider society, resulting in improved interpersonal relationships, the development of trust and increased social capital. Reported benefits of wilderness therapy in the studies in this review highlight similar improvements in communication skills and family and social

relations, especially pertinent when the majority of participants in the studies were adolescents. More details of the benefits to social relationships are shown in Box 4.

Box 4. Reported benefits to family and social relationships from wilderness experiences

- | | |
|---|--|
| <ul style="list-style-type: none"> strengthened family relations be a positive role model for siblings and friends, help family out more, be more open minded and listen to others; better relationship with parents Communication improved although still difficult at times (mother and son) Adolescents reported significant less anger towards parents by end Nature helped him to reconnect to himself - now hope it will help him to reconnect with his children; interpersonal functioning improved - significant for family relationships; Opportunity for family intimacy away from distractions of home adolescents decided they did want to get back with families Y-OQ subscales - significant improvement in interpersonal relations and social problem scores increased capacity to form interpersonal relationships. The group process - learn social skills, solve group problems, redirect socially inappropriate behaviours, team building, positive leadership roles emerge, effective communication, learn to listen to others, learn to express opinions and propose compromises | <ul style="list-style-type: none"> increased awareness of others sense of connection with other wilderness users Group trust and emotional safety, sharing common life changes, non-competitive atmosphere, negotiations between individuals Interpersonally - wilderness recreation strengthened bonds between individuals and it allowed women to see others in a new light Experience nurtures various forms of social cohesion - e.g. trust, cooperation, open communication and group problem solving ability. Increased social aspects - group bonding. Learning to communicate with other people, respect others, who in turn respect them. develop sustaining friendships; Better at handling interpersonal problems, better teamwork Increased social and school attitudes and behaviours; increased quality and quantity of social interactions; Enhanced patient-staff relations Development of trust and respect for others and authority figures; Respondents also had a higher average focus on others in the group and on the Widened communication skills, established integration as a group |
|---|--|

3.4.5 Educational benefits

Educational benefits reported as a result of participation in a wilderness programme focus on knowledge and skills acquisition, be that of hard, practical wilderness skills (camp, survival, trekking skills etc) or soft, interpersonal and communication skills or coping strategies. Reported educational benefits from studies in this literature review can be found in Box 5.

Box 5. Reported educational benefits from wilderness programmes

- | |
|--|
| <ul style="list-style-type: none"> Learning personal and interpersonal skills e.g. communication skills, drug and alcohol awareness, coping skills skill development Case study (after a wilderness programme)- attended local community college to try and increase chances of getting into University Educational values – a natural laboratory for children Knowledge acquisition Youth development and education (participants only, not wider society) Gained remote travel skills (learn to travel to remote destination and return successfully) Knowledge significantly increases Increased feelings of competence, acceptance of failure as a learning opportunity and personal control. Creative expression (poems, creative writing that demonstrates insight into personal growth) 96% said felt learned valuable lessons they would bring back to centre and apply to daily lives |
|--|

3.4.6 Spiritual aspects

Studies reviewed in this research project show that participation in a wilderness programme often results in participants reporting an increase in spiritual values, an awareness of a spiritual dimension and a development of a sense of place. Other spiritual aspects reported are highlighted in Box 6.

Box 6. Reported increases in a sense of spirituality after participation in a wilderness programme

- Participants identified 6 spiritual benefits: 1) the enduring; 2) the sublime; 3) beauty; 4) competence; 5) experience of peace; 6) self-forgetting
- Development of a sense of place - participants develop sense of place that becomes intertwined with their sense of self - i.e. place becomes a part of the self and the self becomes part of the place.
- Long-term wilderness recreation participants create unique meanings for wilderness that may not be available in non-wilderness areas - the meanings are a result of both specific place-based experiences and attachments, but also development of attachment to general concept and values of wilderness
- Spirituality and sense of self (aesthetic and spiritual qualities of wilderness enhance self-restoration and transformation);
- spiritual dimension incorporates sense of hope and self-worth, meaning, purpose and interconnectedness with others
- 50% of participants said experience made them think about where life was heading
- Perspective, perception and consciousness shift - e.g. changes in awareness, perspective etc, having to do with life changing realisations, spiritual awareness and life purpose
- The solo is a wilderness rite of passage - opportunity for personal transformation
- Spiritual components of wilderness therapy - sense of belonging/ connection
- value attached to religious spiritual experience - natural settings viewed as source of renewed and expanded self-identity rather than as an adversary to be conquered
- increased clarity /insight (clear view about some aspect of ones life, new perspective or insight into problems that were previously ambiguous;
- Spiritual development - deep sense of connection to all things (e.g. larger universe, a higher power, nature, feeling of oneness).
- learnt new ways of thinking about their place in the world

3.4.7 Cultural aspects

In a few of the studies incorporated in this review (4), aspects of participants' cultural identity increased as a result of participating in a wilderness experience programme. Reported comments on the increase in a cultural awareness in these studies are included in Box 7.

Box 7. Reported cultural outcomes after participation on a wilderness programme

- Food symbolises a kind of blessing from nature (effect of Japanese religion and culture)
- Increased sense of cultural values and identity (especially for indigenous societies)
- 6/7 said they became more involved in their culture and 5 suggested it was Whakapakari that was the impetus for making them think about getting into their culture.
- 50% - experience represented a special time in their life. Things that made a difference - the people, the family atmosphere, it being a Maori programme, the strictness, togetherness, having time out to think, programme confidence booster. Why it works over other methods - get to know yourself, spirit of Whannau,

3.4.8 Economic considerations

Several of the studies reviewed in this research project reported economic outcomes as a result of wilderness programmes and these include both direct and indirect economic benefits such as the revenue produced by organisation of wilderness trips and ecotourism (direct) or reduced costs to the wider society from changes in participant behaviours (indirect). Other comments relating to changes in economic aspects are shown in Box 8.

Box 8. Reported economic outcomes and aspects

- 8 economic values of wildernesses - 1) Recreational benefits (≈16 million recreation visits to designated wilderness in the lower 48 states, estimated total recreational value of \$634 million annually; 2) Community effects - wilderness visitors spend \$30 per day; 3) Passive use values - \$306 million (existence values and bequest values); 4) Scientific values - \$5 million per year (scientific journal articles); 5) Biodiversity values; 6) Off-site benefits - e.g. increased value of private property; 7) Ecological services - e.g. wilderness watershed protection, \$9 and \$18 million;
- Average daily cost of wilderness programme = \$150, therefore industry generates > \$450 million in annual revenue (Russell, 2003)
- Existence values - satisfaction from knowing protected wilderness areas exist
- Instances of recidivation reduced (i.e. fewer costs to wider society)
- Case study – participant has been working part time for last year since wilderness programme
- Number of patients experiencing legal problems significantly reduced (24% reported problems)
- 31 out of 51 patients involved have been released from hospital including one patient who had been hospitalised for 24 years. While some released entered other kinds of homes, others left with no further treatment.

4. Conclusions

This section outlines the key benefits of wilderness experiences as reported in the studies reviewed, before summarising the gaps in the evidence base and highlighting areas for future research in this field.

4.1 Discussion of outcomes

As the key findings show, the wilderness programmes studied in this research contributed significantly to a range of important outcomes and were successful in initiating many changes in participants' health, behaviour and their attitudes (to themselves, to others and to the natural environment). Although the type and number of outcomes vary between studies and no two studies are exactly the same, several key outcomes emerge. These key outcomes are outlined below:

Attitude to self

- Improvements to participant physical health - cardiovascular improvements, reduced fat in body mass, increased bone and muscle mass, increased physical fitness, reduced anxiety and stress, reduced sleep disturbances and hypertension
- Improvements to participant mental health and well-being - positive changes in self-esteem, self-confidence, self-determination, increased self-efficacy, self-image, greater sense of self-control and self-empowerment.
- Improvement in participants' overall psychological health and wellbeing;
- Development of personal awareness skills
- Improvement of coping skills, emotional regulation and expression
- Development of a sense of accountability for own decisions (both in the programme and in normal life)
- Reduction of negative behaviours
- Reduction in chemical dependency

Attitude to others

- Development of a sense of belonging
- Development of better communication skills and problem solving abilities
- Improvement in and strengthening of interpersonal relationships - with peers, family and staff
- Development of responsibility, mutual respect and the concept of working as a team
- Increase in awareness of others and development of group trust

Attitudes to the natural environment

- Establishment of a connection with the natural environment and development of a sense of belonging to natural setting – ‘at one with nature’
- Enhancement in the understanding of the natural environment and the appreciation of the enjoyment that can be derived from spending time outdoors
- Development of an understanding and appreciation of nature which more likely to foster a respect for nature and for participants to support nature and wilderness conservation in future

Wider benefits

- Development of economic benefits to wider society as participants become more self sufficient and less dependent on welfare support;
- Potential economic savings in benefits payments, hospital treatment, and criminal justice system as participant health improves, as levels of criminal activity and drug and alcohol abuse reduce;
- Increase in social adjustment, reduced recidivism and other positive changes in participant behaviour has implications for increased net social benefits and improved wellbeing of the wider community;

4.2 Limitations of research and gaps in published literature

The evidence base for the benefits of wilderness experiences is continually growing and the large amount of anecdotal data implies there is a strong link between time spent in the wilderness with improved health and well-being and positive social outcomes for a variety of different cohorts of people.

However, the majority of studies into the effects of a wilderness experience are purely qualitative (around 30%) or descriptive (around 50%) with much emphasis on anecdotal evidence. There is an increasing recognition that outcomes need to be quantified to provide further support of the beneficial effects, but only 14% of studies reviewed, included a quantitative element in the research and of these studies, many had small sample sizes (i.e. below 30 people) and no control group. The qualitative studies appear to use a wide range of methods and techniques to assess outcomes and in this review, 60% of these studies had large sample sizes (above 30) but none had a control group. Therefore despite the long history of wilderness therapy, outdoor behavioural therapy and recreational wilderness experiences, there is therefore still a need for further quantitative data to support the qualitative narrative.

Many studies suffer from methodological limitations which cast some doubt over the effectiveness of wilderness programmes as therapeutic interventions. Limitations such as the lack of a control group, lack of a robust sampling strategy, small sample sizes and few large scale programmes. Also methodologies are often not replicable and not all details are reported, so there is a general lack of comparable findings¹⁰. Ten out of 70 studies included at least 1 standardised validated measure for assessing some kind of health or behavioural

¹⁰ Winterdyk & Griffiths, 1984; Gillis, 1992; Cason & Gillis, 1994; Hattie *et al.*, 1997

change, but in the main, there is lack of standardised, reliable and validated measures assessing changes in health parameters. In addition to this, there is a lack of consistency between different programmes and initiatives, even with the same cohort group and this has resulted in piecemeal research.

There is a lack of longitudinal study designs as many studies do not administer follow-up measures to evaluate the long-term effects of participation¹¹ and recidivism rates, sustainability of behaviour changes and attitudes, and long-term health effects have not been monitored. Few studies have directly tested how effective wilderness therapy is in changing behaviour across multiple programmes of different length, with different leadership experience, and who target different cohorts¹².

4.3 Future research needs

Given the limitations to the research outlined in 4.2, there is a real need for further research to address these limitations and key recommendations include:

- Studies which use a mixed method approach - adopting *both* a quantitative approach with robust standardised instruments to quantify outcomes; and a qualitative approach using methodologies which capture rich narratives and a variety of supportive anecdotal evidence.
- Studies with robust methodologies, with larger participant numbers, repeated assessment measures over a longer timescale with some kind of comparison group or control.
- Studies which include a follow-up element after the wilderness experience has finished, examining how long the effects of the experience last for.
- Studies which directly test how effective wilderness therapy is in changing behaviour across multiple programmes of different length, with different leadership experience, and targeting different cohorts.
- Studies which compare the effects of different types of wilderness on either the same sample of participants or the same cohort type, examining whether a particular type of wilderness results in a more successful outcome for a particular cohort.

¹¹ Russell, 1999; Epstein, 2004

¹² Russell, 2003

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6. Appendices

Appendix A. The cover sheet

Label	
Title	
Author	
Date	
Grey/Paper	
Country	
Typology of wilderness	
Cohort	
No of participants	
Exposure time	
Wilderness activities/skills	
Context	
Soft/hard	
Outcomes reported:	
Health	
Social	
Cultural	
Economic	
Other	
Methods	
Measures	
Direct	
Indirect	
Control group	
Summary	

Appendix B. References of literature reviewed in this study

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