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THE CONSERVATION IMPACT OF TRAINING

THE DURRELL CONSERVATION ACADEMY AS A CASE STUDY



BY LUCAS RUZOWITZKY

SUPERVISED BY E.J MILNER-GULLAND, JAMIE COPSEY, AND LIANNE CONCANNON
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DECLARATION OF OWN WORK

I declare that this thesis, “The conservation impact of training – The Durrell Conservation Academy as a case study” is entirely my own work, and that where material could be construed as the work of others, it is fully cited and referenced, and/or with appropriate acknowledgement given.

Signature

Name of Student: Lucas Ruzowitzky

Name of Supervisor(s): E.J. Milner-Gulland, Jamie Copsey, and Lianne Concannon.

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LIST OF ACRONYMS

GDP	Gross Domestic Product
NGO	Non-governmental organisation
ROI	Return on Investment
M&E	Monitoring and Evaluation
MWF	Mauritian Wildlife Foundation
IPÉ	Instituto de Pesquisas Ecológicas

ABSTRACT

Conservationists need to demonstrate the impacts of their work, however many conservation interventions such as training which work with humans, go unevaluated. Impacts here are often less tangible, and take longer to manifest themselves, which can make evaluation difficult amongst the constant constraints of limited conservation funding. Durrell is a conservation training provider with a long history of building capacity through training within the conservation community. The conservation impacts of this training have only been evaluated to a small degree for internal learning. This study aimed to identify which impacts have occurred after training, and then evaluate how training may have influenced these impacts to various degrees. The study utilised a mixed methods approach to collect data on the perceived impacts of training on individuals, their organisations, and then wider systems, where wider systems related to biodiversity conservation.

Trainees reported positive impacts of training on job related performance and advancement, and twenty-five percentage of all respondents also reported creating partnerships with people directly as a result of training. Trainee's primarily improved areas within their NGOs associated with research and development, where training had high positive impacts in areas of logistics, management, public engagement and research and development. No difference was found on the impact of training on improving operating capacity and conservation capacity within an NGO. Trainees reported biodiversity impacts within Species Management, where they were more likely to report a positive impact of training if they held a bachelor's degree compared to having secondary education, and where the probability to report a positive impact of training decreased for trainees in part-time employment compared to those in full-time employment. Trainees also reported biodiversity impacts within Education & Awareness, where they were less likely to report a positive impact of training if they had attended management courses compared to conservation related courses, and where the probability to report positive impacts of training increased with age.

In the future, Durrell could regularly conduct training evaluation by increasing activities associated with data collection, reinforce learning through its online Network, and create partnerships with NGOs which can link strategic learning objectives with its own conservation objectives, to increase understanding of the value added by conservation training courses.

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STATEMENT OF OWN WORK

All data collected for this study were gathered entirely by myself and are entirely my own, including all other works, unless otherwise referenced. I have received valuable academic support from all my supervisors throughout. The contact emails of respondents sampled in this study through the online questionnaire were supplied to me by the Durrell Conservation Academy for the purposes of this study.

1 INTRODUCTION

1.1 Problem Statement

Project evaluations have been scarce within conservation science but have begun to gain traction amongst professionals in the field, who recognise the importance of evaluation for internal and external accountability (Margoluis et al., 2009). The problem however, is that heavy focus has been applied on conducting experimental designs and utilising counterfactuals to evaluate the impact of conservation projects. Many conservation initiatives however work within tight financial constraints, and operate in complex and dynamic human-nature systems, where experimental controls and the use of counterfactuals are often unfeasible, and unethical (Margoluis & Salafsky, 1998). This has created renewed focus on how to accurately capture conservation impacts and attribute them to specific interventions. This is essential given the need to understand what impacts particular interventions have on conservation, to measure effectiveness, adapt interventions based on changing evidence, demonstrate results to stakeholders, donors and other supporters; and ensure that scarce conservation funds are used to maximise return on investment, or maximise conservation impact (Ferraro & Pattanayak, 2006).

Conservationists need to demonstrate impacts, and whilst this has been done by some non-governmental organisations (NGOs) through the use of global indexes which monitor species population trends (Young et al., 2014), conservation initiatives which work directly with humans and create less tangible impacts are more challenging to capture and evaluate. Capacity building recognises that individual conservation actions are typically not enough to create effective change, and that organisations, groups, and networks who have had long-term involvement, are more often required (Rodríguez et al., 2007; Rodríguez et al., 2006). The lack of available human resources with the right set of knowledge and skills however, means that even when local involvement is sought, capacity to conserve local or national biodiversity is ineffective (Rodríguez et al., 2006). Capacity building through training is recognised as a tool which can be utilised to fill this knowledge and skills gap, however within conservation, little evidence exists of its effectiveness to save threatened species from extinction.

Evaluating the impact of training in conservation can however be challenging, as many evaluations often take place many years after training has been received. Evidence suggests that after four or five years, training recipients show difficulty in remembering training activities and their effects on their own learning and actions. Additionally, many training recipients will also have attended different training in this time, and been influenced by other external factors which affect their behaviour, making it difficult to attribute impact to a given capacity building intervention such as training (Taschereau, 1998).

1.2 Relevance of Study to measuring and understanding the conservation impacts of training

The Durrell Wildlife Trust, made up of the Durrell Wildlife Park, the Durrell Conservation Academy, and its field programs, is a conservation NGO working towards saving species around the world from extinction (from here on “Durrell”). Durrell has been training people from around the world in topics related to conservation since 1977. Since then, it has trained over 4000 individuals (Durrell, 2015), and so acts as an appropriate case study to evaluate the conservation impacts of training. This project will assess the impacts which training has had on conservation over the past 30 years, to capture impacts which have occurred post-training, and then evaluate how impacts can be attributed to this training. As well as creating internal and external accountability, an impact assessment of this kind will allow Durrell to adapt its policies around training, and alter or create courses or training techniques which maximise future conservation impact, as a form of adaptive management. For conservation as a field, this study will contribute to the growing understanding of how to measure impacts of conservation interventions such as training.

1.3 Aims and Objectives

The aim of this study was to critically assess the conservation impacts which occur after training on individuals, organisations and the conservation of biodiversity, and evaluate the attribution of these impacts to training received, in order to improve the understanding of how to increase the conservation impacts of training. This aim was achieved by addressing the following research objectives.

1. To investigate training practices and how training has changed in the academy over time, in order to gain knowledge and understanding on how to effectively measure the conservation impacts of training, appropriate to the Durrell Conservation Academy.
2. To evaluate the conservation impacts which have occurred to individuals, organisations and wider systems, after people attended training.
3. To assess how these conservation impacts have been influenced by training received at Durrell.
4. To create a preliminary theory of change framework which could allow Durrell to regularly monitor the impacts of its training in conservation in the future.
5. To make recommendations to Durrell about how to move forward with training impact evaluation.

2 BACKGROUND

2.1 Capacity building for conservation – a definition

Capacity building has its origins in human development, and is interpreted with mixed understanding between many international NGOs, who often used words such as “capacity building”, “capacity” and “impact” interchangeably (Morgan, 1998). Adding to this lack of definitional clarity, capacity building is also used to refer to both a process and an outcome (Brown, LaFond & Macintyre, 2001). Capacity building has been defined as - “*the approaches, strategies and methodologies which are used by national participants and/or outside intervenors to help organizations and/or systems to improve their performance*” (Morgan, 1998). Along with this, *capacity* in and of itself must also be defined. It has been described as - “*the organizational and technical abilities, relationships and values that enable countries, organizations, groups and individuals at any level of society to carry out functions and achieve their development objectives over time*” (Morgan, 1998).

2.2 Capacity building in practice

Within conservation, mixed strategies have been adopted in an attempt to conduct capacity building. These strategies are typically dependent on an NGO’s mission and their own capacity, with some focusing directly on individuals (Durrell, 2015; Durrell, 2011), whilst others focus on capacity building through organisations and wider systems (Fairburn, 2013). Capacity building is a process where actions are taken in order to alter institutional, organisational and individual behavioural outcomes (Brown, LaFond & Macintyre, 2001; Morgan, 1998). Impacts refer to the results of these actions, and are evaluated in order to improve approaches to creating capacity within different scenarios (Morgan, 1998). Whilst some conservation success stories do exist (Young et al., 2014), conservation has mostly failed to reduce the loss of global biodiversity (Butchart et al., 2010). Capacity building offers conservationists an approach to creating long-term sustainable solutions within conservation interventions, to increase success (Porzecanski et al., 2014). The strategies available for conducting capacity building are broad, from providing direct financial or physical incentives for individual improvement; to helping to build capabilities within organisations; or to improving the operating environments of larger external systems (Fairburn, 2013; Lusthaus, Adrien & Perstinger, 1999; Morgan, 1998). Activities used by NGOs to build internal capabilities within organisations may include providing both short and long-term technical assistance, facilitating improvements to physical working conditions,

providing financial management support and lastly, providing training to staff members within those organisations to increase knowledge and improve skills (Fairburn, 2013; Morgan, 1998). The true purpose of capacity building is not simply to achieve a desired goal in the short-term, but to ensure that individuals and organisations can continue with their activities and make improvements to wider systems well into the future, without external support (Brown, LaFond & Macintyre, 2001; Lusthaus, Adrien & Perstinger, 1999). If we are to understand if activities such as training are having lasting positive effects in areas such as biodiversity conservation, then we need to understand how our interventions have impacted particular components within the capacity building framework, and for that we need to increase activities associated with monitoring and evaluation.

2.3 Monitoring and Evaluating Conservation Practice

Monitoring and evaluation (M&E) continues to be of particular importance to conservationists, as global biodiversity continues to decline. More organisations are conducting monitoring and evaluation in an attempt to increase accountability for actions taken and money spent in the effort to prevent species extinctions (Young et al., 2014; Stem et al., 2005; Yoccoz, Nichols & Boulinier, 2001). M&E provides answers to questions about how well capacity building interventions are working, and can identify conditions or factors under which conservation actions are more likely to result in a desired conservation impact, rather than fail (Stem et al., 2005). Approaches to M&E vary by necessity and context, however most are categorised by a need to fulfil one or more of the following goals: research, accounting/certification, status assessments, and effectiveness measurement (Salzer & Salafsky, 2003). The approaches utilised will depend on which of these goals organisations are working towards. Historically, most M&E has focused around status assessments in an attempt to gain understanding of the existing state of biodiversity at a given point (Yoccoz, Nichols & Boulinier, 2001). Whilst this is still a large part of M&E which takes place within conservation, more organisations are conducting effectiveness measurements, due to increasing needs to understand whether their interventions are having their intended outcomes (Stem et al., 2005).

Measuring effectiveness of work is divided into two broad categories, (1.) impact assessment and (2.) adaptive management (Stem et al., 2005; Salzer & Salafsky, 2003; Yoccoz, Nichols & Boulinier, 2001). Impact assessments can occur at different stages within a project, either as (1.) after an idea is developed but before it is implemented or (2.) after a project/initiative

has been completed. Stage 1 is used to determine possible impacts prior to them occurring whilst stage 2 is conducted in order to determine if an initiative has achieved its desired outcome (Stem et al., 2005; Salzer & Salafsky, 2003). Ideally, assessing conservation impacts of a project should be preceded by robust planning and implementation measures, and not occur as a later addition to a projects' outputs (Margoluis & Salafsky, 1998). Goals, objectives, actions and management indicators used to measure progress towards a particular outcome must be framed in a way that will allow a project or a conservation organisation to infer cause-and-effect relationships (Stem et al., 2005).

2.4 Looking for Cause-and-Effect

Attributing an impact to a particular intervention is necessary if causal links are to be made between changes in outcomes and actions taken (Leeuw & Vaessen, 2009). This can be difficult to achieve for most conservation interventions, outcomes can be very subtle, can take time to manifest and are often intangible, making links between cause and effect difficult to quantify (Howe & Milner-Gulland, 2012). The most robust forms of evaluation require extensive technical skill, often utilising scientific approaches such as randomised control trials, propensity score matching, regression analyses and the development of counterfactual scenarios (Leeuw & Vaessen, 2009).

Whilst constructing counterfactual scenarios may not be the most challenging on a technical level, other forms of evaluation utilising complex mathematics may be a barrier to increasing the use of evaluations within conservation, as they require technical skill which can be beyond the scope of conservation practitioners within field sites. Additionally, there are numerous ethical constraints associated with using approaches such as randomised control trials; conservation funds are in a perpetual short supply, randomised trials would require interventions to be adopted at random, potentially directing funds to places that do not require them the most (Kleinman et al., 2000). These limitations are more pronounced when trying to evaluate the impacts of training programs in conservation, as these impacts can take many years to manifest themselves. Adding to the problem is that of trainee recall, the likelihood of individuals remembering the impacts of such interventions decreases if an evaluation is done long after an intervention. Evidence suggests that if evaluations are conducted longer than eighteen months after training, that separating the impacts of training from the impacts of other factors within an intervention, becomes difficult to discern (Taschereau, 1998).

2.5 Perception-Based Evaluations

Perception based evaluation falls under the category of participatory approaches to impact evaluation (Leeuw & Vaessen, 2009; Cousins & Whitmore, 1995). When centred on measuring the conservation impact of training, participants can be asked about perceived impacts of training towards particular actions or outcomes within conservation, as potential sources of evidence (Cousins & Whitmore, 1995). This approach moves beyond asking questions simply associated with “*what would have happened in the absence of the intervention?*” and more towards creating descriptive indicators of impact which allow for a deeper understanding of the processes involved in conservation interventions such as training (Ferraro & Pattanayak, 2006). The focus moves to an approach of capturing training impacts according to “*whom*” (Leeuw & Vaessen, 2009), where *whom* in training impact evaluation would be the training participant.

Methods for collecting data through this approach include using questionnaires, semi-structured interviews and focus group interviews. These methods are open to unintended behavioural responses. People may respond differently if they know they are part of a response group and biases increase when a study relies solely on recall or self-reported information (Newing, 2011). Attempts can be made to highlight these effects but if no control groups are present, then highlighting biases at the start of an evaluation becomes unachievable. Perceptions can be interpreted with regression based analyses, which do not rely on control group comparisons for counterfactual analyses and when differences in characteristics between participants, and interactions between intervention factors can be measured. This is particularly useful when interventions such as “training” are “*all or nothing*” (Leeuw & Vaessen, 2009), i.e. all participants of a particular training course or training program are exposed to the same treatment or are not. These methods are not immune to producing reported impacts which could be explained by confounding factors (Ferraro & Pattanayak, 2006). These methods can however be used by small conservation NGO’s to elucidate factors which can describe trends observed in impacts, and used to improve conservation practice.

2.6 Training Impact Evaluation

When it comes to measuring effectiveness in training and gaining an understanding of training impacts, Donald Kirkpatrick's four-level model for evaluating training programmes can perhaps offer conservation organisations a more systematic way to measure the impacts of their training. The four-level's offer training providers ways to sequentially evaluate their training, with each level becoming progressively more challenging and time consuming to carry out (Kirkpatrick & Kirkpatrick, 1994). These four stages are summarised in table 1.

Table 1 Overview of Donald Kirkpatrick's four-level model for impact evaluation.

Level	Type	Description	Method
1	Reaction	How did trainees feel about the learning experience?	- Happiness sheets - Post-training surveys
2	Learning	Did the trainees learn anything?	- Before & After tests - Face-to-face interviews
3	Behaviour	Did the trainees use what they learned?	- Observation and interview - Communication with line managers
4	Results	Did outcomes change?	- Performance measures - Systems change – proving attribution

Adapted from (Kirkpatrick & Kirkpatrick, 1994).

For conservation organisations which have been training individuals from external organisations for many years, with no prior forms of evaluation other than perhaps evaluations occurring at levels one and two, attempting to infer causality post-hoc years after training has occurred is perhaps impossible given that most trainees will have lost contact with the training provider, and any impacts which have occurred could be as a result of many other confounding factors (Ferraro & Pattanayak, 2006). Perhaps what is more possible is to adapt the approaches used in other forms of monitoring and evaluation, along with an understanding of how capacity is built in complex systems, to measure impact of training in conservation by asking individuals about perceived impacts. A wide body of research exists on the impacts of training within fields such as economics and human development, where impact indicators are well established and often more easily quantified than those for training impacts in conservation.

2.7 Training impact and evaluation in Economics and Human Development

The field of economics has been progressive in its use of impact evaluation of training at most levels within the public and private sector, with literature in this field dating back to the early 1970s. This comes from a need within economics to measure its “return on investment” (ROI), put simply, a process which attempts to measure how much money has been made as a consequence of spending money on training individuals for a particular purpose (Psacharopoulos, 1995). Human development is perhaps more closely linked with conservation in its approaches to achieving its set goals. The field has long moved beyond simply providing aid to developing countries at the national level, focusing more on developing capacity at individual, organisational and institutional levels (Arguinis & Kraiger, 2009). Both fields recognise the importance of training, where in economics training is provided to individuals for the purposes of creating “human capital” and enforcing “productivity” in all sectors of society. In human development, training is centred on development objectives which use training and education to lift people out of poverty, by reducing the knowledge and skills gaps which produce unemployment or underemployment (Palmer, 2005; Heckman, 2000; Psacharopoulos, 1995). Whilst the terminology differs, training and education strategies within conservation to promote capacity building in individuals and NGOs, to increase capacity and thus increase conservation impact, are similar to training and education policies promoted within economics and human development which deal with creating human capital, increasing productivity and reducing poverty (Palmer, 2005; Heckman, 2000). What differs are the motives behind these actions. The problem faced by conservation is that we have been poor at understanding these impacts, something made easier in economics and human development, where indicators for the impacts of training can be measured from quantitative numeric outputs such as individual or organisational profitability, national GDP or indicators from human development indexes.

In economics (encompassing sectors such as business and finance), research supports the notion that training has the greatest impact, or creates the highest ROI, when directed at young people, primarily because younger individuals have a longer time frame to create impact but also because they are more receptive to knowledge and skill acquisition, and because this acquisition promotes further acquisition, or increases a willingness to learn (Taschereau, 2008). Young people also tend to be less resolute in their ways, or too inexperienced to know any better, which allows training providers or their employers to

produce more desired outcomes, according to their needs or goals (Heckman, 2000). Other evidence found within human development through microfinance initiatives, outlines that training programs have the greatest impact when (1.) course content is matched with the specific needs of a course participant and placed within her/his country context, (2.) support from training providers is offered post-training to assist with ideas implementation and (3.) other members within an individual's organisation have also attended training of a similar kind (Taschereau, 2008). The impacts derived from training individuals, their teams, organisations and society as a whole, both within economics and human development have been extensively researched, and are summarised below.

2.7.1 Impacts of training for Individuals and Teams

Individual benefits of training relate to improvement of job performance, where the acquisition of new knowledge and skills improves or increases job output (Hill & Lent, 2006). One study found that the training of individuals had a largely positive impact on job related behaviours and performance compared to non-trained control groups (Arthur Jr et al., 2003). Training approach was however a significant factor in determining the impact of training on job-performance, where training programs which combined topics related to theoretical knowledge, the development of interpersonal skills and opportunities for learning-by-doing (psychomotor skills), had the greatest impact. Renewed interest has also grown in promoting the benefits of leadership training, where trained individuals can promote group wide team benefits such as increases in feelings of self-actualisation, willingness to increase effort, and self-empowerment; where increases in independent thinking, active self-engagement in tasks and self-efficacy are observed (Black, Groombridge & Jones, 2011; Arguinis & Kraiger, 2009).

2.7.2 Impacts of training for Organisations

The primary training impacts for organisations relate to benefits gained toward improving day-to-day operating capacity and secondary impacts termed as "others". These are termed as "others" since they will vary between organisations, depending on the type of field in which that organisation operates. Impacts on operating capacity can usually be measured by evaluating organisational effectiveness (through measures of human resource management) and profitability or funding (Arguinis & Kraiger, 2009). The challenge associated with capturing organisational impacts of training arise from the need to evaluate employee

improvement through senior management, and match this with financial output of the employee as a measure of improved productivity, something challenging to achieve. Impacts of training may also present themselves as reduced operating costs (cost-effectiveness improved or costs reduced directly), improved operating quality or increased production quantity (Collins & Holton, 2004). “Other” impacts are less tangible, and depend on the type of organisation, but are often classified as being related to organisational performance indirectly. These can include (depending on the type of training) organisational training impacts which promote long-term improvements to social capital, where co-worker relationships are improved, working norms developed, organisational trust gained, and reputation improved (Arguinis & Kraiger, 2009).

2.7.3 Impacts of training onto wider systems

Most indicators used to measure the impacts of training on wider system such as nation states come from economics, where improvements made to a national labour force through different forms of training, can result in higher national productivity (Heckman, 2000). Training can also have wider advantages by allowing for the inclusion of some countries into beneficial economic or environmental unions, where continued training is a mandate for this inclusion (Cho & McLean, 2004). An example of system wide benefits of training can be seen with the Convention on Biological Diversity (CBD), which uses training in its attempts to mainstream biodiversity action plans into national policies and programs with its member states, as this training builds capacity for the future implementation of such plans (CBD, 2011).

2.8 Impacts of training in Conservation

The benefits outlined previously have the potential to occur within conservation. Studies within conservation however tend to focus on evaluating the impacts of training according to levels 1 and 2 of Kirkpatrick’s four-level training evaluation model. One descriptive study from the BP Conservation Programme, evaluated the impact of training on different aspects of conservation practise in its alumni network (CLP, 2014). Respondents reported benefits gained from training in terms of academic skills development, academic advancements, professional advancements, networking and field experience. Organisational impacts were described in terms of factors such as – project continuation, protected area designated and habitat/specie improved (CLP, 2014). A report published by the Tropical Biology Association found that the impact of training related primarily to knowledge acquisition,

increased confidence and a greater willingness to work collaboratively (TBA, 2015). Other studies exist on the impacts of single day training courses, where most impacts are associated with knowledge and attitudinal change amongst students (Mukhacheva et al., 2015; Nates, Campos & Lindemann-Matthies, 2012). What is missing from these studies are longer-term quantifiable measures of the actual impact which training has had on these conservation impacts occurring. One such study, although not directly related to training impact, evaluated the impact of targeted financial and technical development within conservation NGOs, as a different strategy towards achieving capacity. Utilising counterfactual scenarios and a return on investment analysis, the study demonstrated how different levels of financial and technical support impact organisational outcomes in different ways, and how future support can be strategically targeted in order to increase conservation impact (Fairburn, 2013).

2.9 Conservation Impact

Many of these studies refer repeatedly to *conservation impacts* as a whole, with no definition of the term (CLP, 2014; Fairburn, 2013). This term occurs often in non-published literature, and within published literature a search has failed to produce any definition of what conservation impact actually means. This is important given that the conservation impact of training could mean a broad number of things. What do we mean by impact, impact of training on what? Do we mean the impacts of training on people in conservation? If so, what impact on people? Do we mean impacts of training on biodiversity conservation? Which areas of biodiversity are we referring to? Species increases? Habitat protection? Do we mean training impact on public awareness? Are these things conservation impacts as a whole? For the purposes of clarity within this thesis, conservation impact has been defined as follows:

Conservation Impact of training: A self-reported improvement in the capacity of a conservation practitioner and/or organisation to conduct conservation, leading to a perceived actual or potential reduction in biodiversity loss, which the training recipient assigns in whole or in part to a specific training intervention.

2.10 Conservation Training history at the Durrell Conservation Academy

Since its founding in 1977, approaches to training at the Durrell Conservation Academy have closely followed changing approaches to conservation practice adopted by the Wildlife Trust's animal park and field programs. Training has as a result been through numerous

transitions throughout its history, both in terms of management approaches and choice of teaching material related to conservation (Fa, Clarke & Hicks, 1995). In the first few years of operation at the end of the 1970s, academy training focused heavily on training individuals in captive breeding and animal management. Matched with the approach of the Wildlife Park to conduct conservation by preserving species ex-situ, trainees were equipped with knowledge and skills related to animal husbandry, the selection and collection of species for exhibit, enclosure design, record keeping and approaches to reintroduction (Waugh, 1980). The focus was heavily grounded in providing trainees with some theoretical knowledge of husbandry but primarily offered trainees the opportunity to receive a high degree of practical experience of working within the wildlife park itself (Fa, Clarke & Hicks, 1995; Waugh, 1985; Waugh, 1983). Trainees were selected on the basis of being either (1.) government sponsored employees from countries with high environmental degradation and threat of species extinction, who could return home and set up captive breeding programs, or (2.) people from other zoological facilities who could improve the captive breeding success of species within their own collections (Waugh, 1983). The academy recognised at the time that if training of this kind were to achieve any significant impact post-training, that post-training support was needed along with training assessments exploring effectiveness, in order to measure long-term and site-level impacts (Waugh, 1985; Waugh, 1983). The early demand for such training, evidenced by the increase in applications received by the academy in the following three years after opening, meant that the academy began to diversify the courses it offered and its approaches to teaching (Waugh, 1983).

The academy began running summer school training in 1980, where broader concepts within conservation biology were taught such as general knowledge in biodiversity, zoo administration and management, public education, biodiversity research, and project and computer skills. This placed less emphasis on practical experience and more emphasis on theoretical concepts, utilising approaches to teaching centred on lectures, group discussions, presentations, and small group research projects (Fa, Clarke & Hicks, 1995). These lectures were later delivered by professionals within conservation, who were part of a visiting fellowship scheme which the academy established in 1987 in an attempt to increase and encourage knowledge sharing between experts in the field, staff and trainees (Waugh, 1987). This led to the development of more diversified discrete courses catering to the needs of particular professionals in different fields related to conservation, as well as courses aimed at amateurs and students (Fa, Clarke & Hicks, 1995). Candidate selection became more

diversified, with different selection protocols adopted based on the types of courses offered, and based on the goals of the academy to providing those courses. Post-course support and evaluation, in the form of visiting candidates in their home countries after training (as done in the early 1980s), began to become less feasible with the increased number of candidates attending training each year. Instead, small sporadic evaluations were conducted, along with a proposal to establish a graduate network, as a way of supplying content and information to previous trainees and as a way of keeping close contact with trainees to learn about any developments which they carry out after training (Fa & Clarke, 1997; Fa, Clarke & Hicks, 1995). The decade following the late 1990s and up until today saw the Academy increase the number of courses it offered to allow it to conduct training year round, establishing links with numerous universities and incorporate training as part of accredited degrees in conservation science. Some of these courses are used solely by the academy for generating needed revenue for the Trust, whilst others are still delivered to accomplish its mission of saving threatened species from extinction (Jamie Copsey & Tim Wright, 2015, *Pers. Comm.*¹). Some of these courses along with the year they were started and their main focus are outlined in table 2 (see - goo.gl/JPb1F5 - for a full list of courses currently offered).

Table 2 Representative sample of some of the training courses, their focus and when they were started at the Durrell Conservation Academy

Course Category	Course name and focus	Year started, location, duration and reference.
Conservation	Durrell Endangered Species Management (DESMAN) Knowledge and skills development to maximise effectiveness at managing or participating in conservation projects.	1977 Jersey, 3 months (DICE, 2015)
	Conservation Education and Evaluation/Interpretation Skills on how to deliver conservation education programs and collect evidence of impact.	2011 Jersey, five days, (Durrell, 2011)
Hobbyist	Beauty of Birds Guide to birds, their natural history and how to study them.	2011 Jersey, three days, (Durrell, 2014)
Husbandry	Callitrichid and Lemur Husbandry Skills development for managing and breeding callitrichids and lemurs.	2008 Jersey, five days, (Durrell, 2013)
Management	Facilitation and Communication Skills Skills development needed to facilitate meetings and workshops with multiple and potentially conflicting interests.	1995 Jersey, five days, (Durrell, 2015)

¹ Jamie Copsey is Head of conservation training at the Durrell Conservation Academy.
Tim Wright is Deputy Head of conservation training at the Durrell Conservation Academy.

The need to offer training and the approaches used to conduct training are today framed as wider objectives within Durrell's conservation strategy, as a method they use to improve conservation success, by conducting capacity building within areas of the world where they operate (Durrell, 2011).

2.11 Impacts of training at the Durrell Conservation Academy

The Academy has conducted studies on the impacts of its training intermittently throughout its history. In the early 1980s, frequent visits were conducted to the home countries of many trainees, to personally evaluate how progress was being made towards implementing knowledge and skills learned during training into conservation action. One visit to Brazil found that knowledge and skills had been utilised to construct captive breeding facilities for different marmoset and tamarin species (family *Callitrichidae*), whilst another visit to Thailand found that captive breeding facilities had been built to house different species of pheasant (family *Phasianidae*) (Waugh, 1985). Whilst no quantifiable measure of how training impacted the construction of these facilities exists, it is appropriate to assume, given how little such information was available at the time, that training at the academy was instrumental in passing on the knowledge and skills needed to build these facilities, and knowledge needed to care for these animals in captivity.

Another study conducted on a Durrell facilitation course focused on evaluating the training impacts according to levels one and two of Kirkpatrick's four-level training evaluation model, focusing on the reaction and learning of respondents who attended training. The study found that training had an impact on trainee perspectives of how to conduct conservation initiatives, and found that most trainees reported improvements in social skills such as team building, conflict management, searching for integrated solutions, listening, giving and receiving feedback, and the promotion of tolerance between cultures. Some respondents also said that knowledge and skills were applied to organise congresses, facilitate meetings and educate children (Westley, Seal & Clarke, 1999). This course started in 1995 and the study evaluated its impacts on all trainees (who took the questionnaire) up until 1999, despite this, no timeframe was provided for how long after training specific examples of impacts occurred.

A recent study conducted by Durrell on a previous cohort of DESMAN trainees evaluating Level's 1 and 2 of Kirkpatrick's model also found similar findings related to knowledge acquisition, skills development and technical ability to conduct conservation (Payne, 2015),

as outlined in previous literature describing similar findings (TBA, 2015; Mukhacheva et al., 2015; CLP, 2014; Nates, Campos & Lindemann-Matthies, 2012).

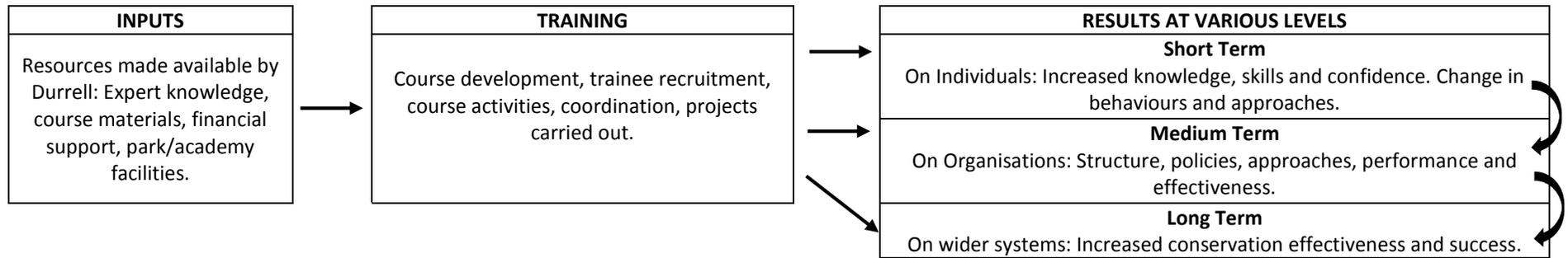
2.12 Making a difference in conservation

2.12.1 Theory of Change

Whilst training has been demonstrated to have positive impacts within different fields and some areas of conservation, impact evaluations will only add value if the knowledge gained on “what works”, is applied to improve future conservation interventions (Margoluis et al., 2013). Theory of Change has been increasingly used by conservation practitioners as a tool to describe the sequence of outcomes that arise as a result of an intervention or particular actions. It allows an organisation to systematically outline the changes it wants to make (outcomes) and how it plans to achieve them (activities). Theories of change are typically represented as diagrams, where all inputs, outputs, outcomes and assumptions are outlined. They also help in determining what indicators need to be measured consistently over time, and when backed up by evidence obtained from impact evaluations, can help demonstrate the attribution of an intervention to a particular outcome. Theories of Change can be conducted through the use of results chains, which when conducted by large teams and with other stakeholders, can make assumptions behind actions intended to achieve a particular outcome more explicit (Margoluis et al., 2013).

An example of this can be seen in a framework adapted to produce a map of assumed and observable linkages between training at Durrell and organisational wide activities, and their impacts on individuals and organisations, along with expected outcomes and anticipated impacts (Taschereau, 1998). This framework, along with others outlining results chains or logic models for different interventions within conservation, can help understand the assumptions between training and conservation impact, in order to later develop appropriate indicators which will help training providers know if their desired outcomes or impacts are being achieved (figure. 1) (Margoluis et al., 2013).

THE CHAIN OF RESULTS



MAPPING OUT ASSUMPTIONS ABOUT HOW CONSERVATION TRAINING AFFECTS CHANGE

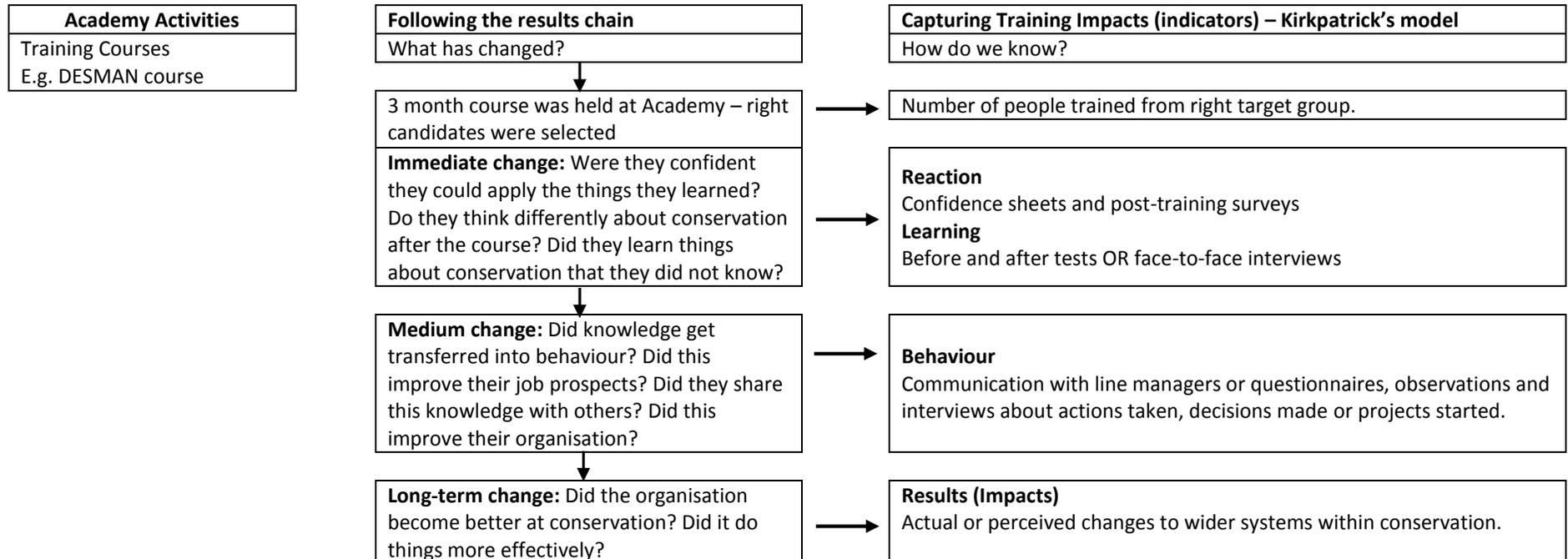


Figure 1 A framework for mapping out assumptions about conservation impacts of training - adapted - (Taschereau, 1998; Kirkpatrick & Kirkpatrick, 1994)

3 METHODS

3.1 Conceptual Framework

The research objectives of this study were framed in an attempt to provide a full understanding of the impacts of training on conservation. As outlined in the background literature, capacity building can occur at three levels (individuals, organisations, systems), interconnected by the actions taken by individuals (Lusthaus, Adrien & Perstinger, 1999). The approach to critically assessing the impacts of training was therefore centred on asking questions about impacts directed at individuals, then actions taken by them within their organisations and lastly actions taken within biodiversity conservation to achieve conservation impact (Porzecanski et al., 2014). This approach was merged with Kirkpatrick's four-level training evaluation model, to create a framework for understanding the conservation impacts of training, as outlined in figure 2.

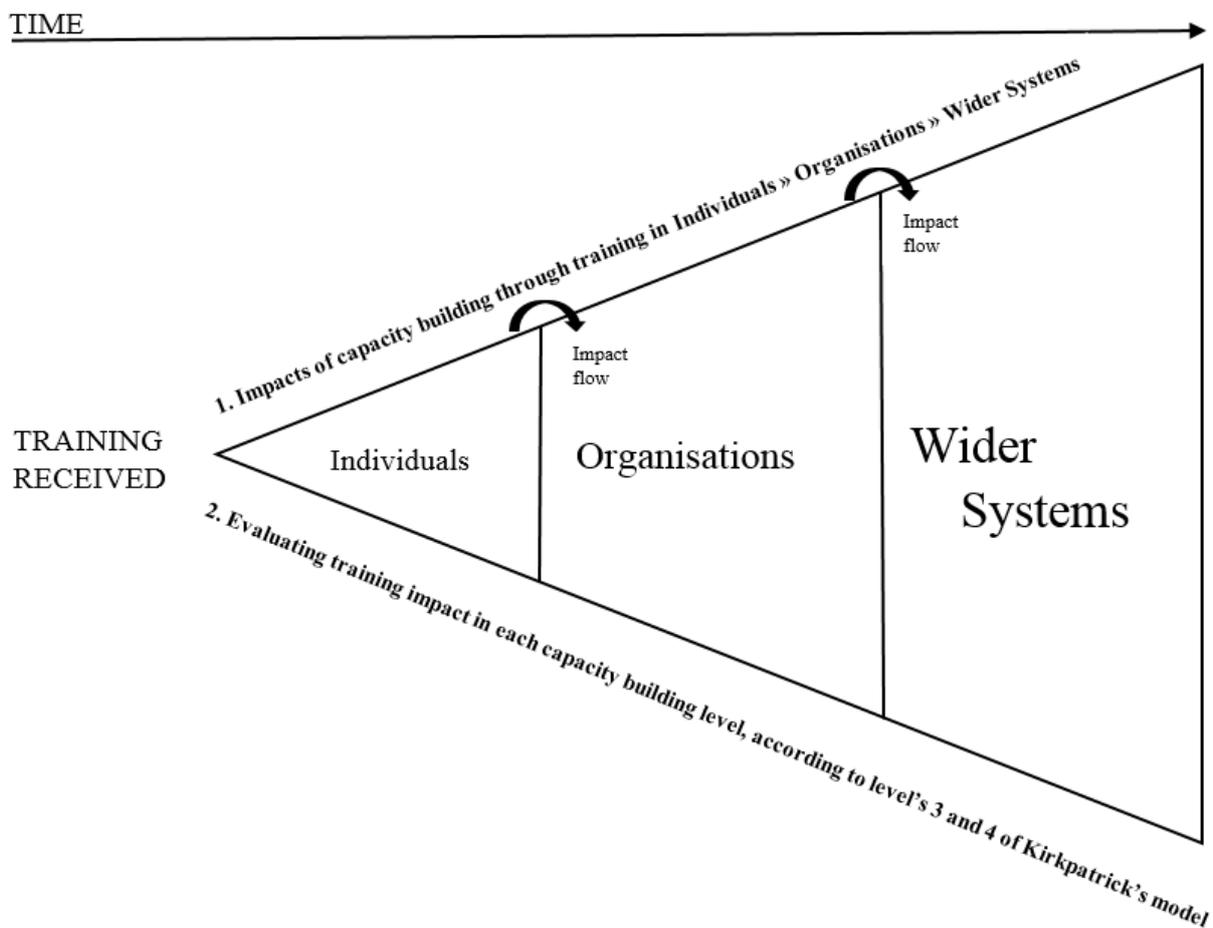


Figure 2 Conceptual framework for measuring conservation impact of training - adapted (Porzecanski et al., 2014; Kirkpatrick & Kirkpatrick, 1994).

3.2 Methodological Framework

Given that many past trainees are globally dispersed, and that measuring the impacts of training by looking at changes in outcomes is unfeasible, and that no baseline data were available for any comparisons of change to infer causality, a mixed methods approach was used. The qualitative component of this research was carried out as a scoping study, in order to gain knowledge and understanding of the training history at Durrell, and gain an understanding of the potential impacts of training, by speaking to management staff and current trainees in the form of semi-structured interviews. The quantitative aspect of this research was conducted through an online questionnaire, and focused on measuring perceived impacts of training throughout different stages of the conceptual framework. This methodological approach is outlined in figure 3, along with the research objectives. The primary results presented will centre on data collected quantitatively.

Aim: To critically assess the conservation impacts which occur after training on individuals, organisations and the conservation of biodiversity, and evaluate the attribution of these impacts to training received, in order to improve the understanding of how to increase the conservation impacts of training.			
Objective 1	Objective 2	Objective 3	Objective 4
To investigate training practises and how training has changed in the academy over time, in order to gain knowledge and understanding on how to effectively measure the conservation impacts of training, appropriate to the Durrell Conservation Academy.	To evaluate the impacts which have occurred to individuals, organisations and wider systems, after people attend training.	To assess how training has been attributed to these impacts which have occurred.	To create a preliminary theory of change framework and make recommendations to Durrell about findings and training impact evaluation.
Method 1	Method 2	Method 3	Method 4
<i>Scoping study - qualitative approach</i> 1. Semi-structured interviews on trainees 2. Key Informant interviews on management 3. Literature search of past studies at academy from internal journal.	<i>Main study – Quantitative approach</i> Develop online questionnaire which captures post training conservation impacts and post-training events which trainees go on to do.	<i>Data analysis</i> Analyse data according to objectives outlined.	<i>Data presentation and discussion</i> Present findings and discuss implications of findings in relation to previous literature and how Durrell can use information collected.
Outcome 1	Outcome 2	Outcome 3	Outcome 4
Knowledge and understanding gained in order to develop <i>objective 2</i>	Data collected to analyse impact of training on conservation.	Results needed to develop preliminary theory of change framework.	Knowledge and understanding of the conservation impacts of training.

Figure 3 Methodological framework for measuring the conservation impacts of training

Individuals who have been trained by Durrell acted as the sample group used in this study. Contact information has been recorded by Durrell from most people who have attended training at the academy, and information collected from them was used to understand which conservation impacts have occurred, and how training has contributed to these impacts. The impacts of training were assessed according to demographic and course factors related to training, in order to get a more accurate understanding of how these factors relate to different conservation impacts and the impacts of training. The mixed method approach used for this study was appropriate given that questionnaires allowed for a large sample of information to be collected online, whilst qualitative interviews in the scoping study allowed for deeper prior understanding into perceptions and thoughts about training impact personally. The knowledge gained in the scoping study also informed the development of the online questionnaire. This allowed for some flexibility in analysis and the possibility to explore issues and themes that would otherwise be difficult to capture through quantitative research alone (Newing, 2011).

3.3 Study design

3.3.1 Scoping Study

Face-to-face semi-structured interviews were conducted with 12 participants of the Durrell Endangered Species Management Course (DESMAN), held at the Durrell Conservation Academy on Jersey Island. An additional 6 semi-structured interviews were conducted with Key Informants made up of members of staff within the management team of the Academy (see tables 20&21 in appendix 3). Access to internal papers was gained, together forming the basis of knowledge acquired in order to meet objective 2.

3.3.2 Questionnaire

A self-administered questionnaire was developed to collect the quantitative data needed to achieve Objective 2 (see full questionnaire in appendix 1). Self-administered questionnaires reduce biases such as confirmation bias and anchoring, which are associated with questionnaires conducted through face-to-face interviews. This type of questionnaire was also appropriate given that respondents were globally distributed (Newing, 2011).

3.4 Sections and Questions

The questionnaire was divided up into three sections, representing the conceptual framework selected for this study. The introductory section collected past and current demographic data about trainees. This included questions about age, nationality, employment status, level of education, type of employment sector and years in a position. Questions were also asked about the type of course and the year trainees attended training at the academy (appendix 1).

3.4.1 Section 1

Section 1 represented the first stage within the conceptual framework associated with evaluating the conservation impacts of training on individuals (see appendix 1). Questions in this section first asked trainees about post-course events, and other career progression. These events were organised into three groups, namely (1.) Did trainees return to work? (2.) Did trainees start work? or (3.) Did trainees start education? The focus of this section centred on individuals who returned to work, in an attempt to evaluate similar impacts regarding job performance as outlined in the literature (Taschereau, 2008; Palmer, 2005; Heckman, 2000; Psacharopoulos, 1995). If trainees selected “yes” to the question of “did you return to work?”, then additional questions were presented about any potential “role” changes within that position and salary changes. All questions were then followed with a question designed to capture attribution of these conservation impacts on training received at the academy. Trainees were asked to select a level of attribution from the following four level scale (1.) Direct result of training, (2.) Somewhat as a result of training, (3.) Unrelated to training and (4.) Hampered by training. This was used as the measure of attribution to later evaluate the effect of training on conservation impact. Where possible (if enough responses were received), analyses were either conducted on the impact of training based on all of these four categories, or lumped together into either positive or negative levels of attribution when sample sizes were very low (table 3).

Table 3 Levels of attribution for assigning impact of training

Positive Attribution	Negative Attribution
(Very Positive Impact) Direct result of training	(No Impact) Unrelated to training
(Positive Impact) Somewhat as a result of training	(Negative Impact) Hampered by training

3.4.2 Section 2

Section two represented the second stage within the conceptual framework associated with evaluating the conservation impacts of training in organisations (see appendix 1). Here, past trainees were asked questions related to actions taken within their organisations which “*improved any aspects of activities related to the following departments*”. Trainees were presented with the seven organisational departments and asked to select as many departments where they felt they had implemented or used knowledge or skills learned in training, according to activities classified within those departments. The departments and activities associated with them are outlined in table 4.

Table 4 Organisational departments and associated activities for organising impacts

Department	Activities related to -
Accounting and Finance	Funding, and profit
Human Resource Management	Staff turn-over, motivation, volunteers, in-house training, and formal education
Marketing	Social media and use of marketing materials
Management and Administration	Data management and information management systems, project management, transparency, and organisation partnerships.
Logistics	Project planning, prioritising and coordination.
Public Engagement	Community engagement and outreach, public education, and campaigning and lobbying
Research and Development	Scale of work conducted, interdisciplinary collaboration, publications, and access to specialised equipment

The decision to organise these actions into organisational departments was made purely to create a more systematic way of organising potential impacts into categories which made sense for organisations. These categories also represented areas within organisations which could evaluate impacts on operating capacity and “other” potential impacts as outlined previously (Arguinis & Kraiger, 2009; Collins & Holton, 2004). The associated activities for each department were sourced from looking at job descriptions for these departments from job searching databases such as environmentaljobs.co.uk. Once this was done, trainees were again asked to assign a level of attribution (as previously described) to the impact which training had on them taking actions to improve activities within those departments.

3.4.3 Section 3

Section 3 represented the third and final stage of the conceptual framework associated with evaluating the conservation impacts of training in wider systems, where questions were organised according to different biodiversity areas (conservation impacts for biodiversity

conservation). As with *Section 2*, trainees here were asked to select one or more of seven areas within biodiversity conservation to represent areas where they were able to implement/use knowledge/skills learned in training to take action towards “*identifying, managing, making, implementing, changing or providing*” activities related to those areas, as outlined in table 5. Trainees were then asked to assign a level of attribution to the impact which training had on these actions taken (see appendix 1).

Table 5 Biodiversity areas and associated actions*

Area	Actions related to/at -
Land and Water Protection	Identifying, establishing or expanding parks or other legally protected areas, and to protect resource rights.
Land and Water Management	Conserving or restoring sites, habitats and the wider environments.
Species Management	Managing or restoring species, focused on the species of concern itself (including veterinary medicine).
Education and Awareness	Improving understanding and skills, and influencing behaviour (directed at people).
Law and Policy	Input into formal government sector legislation or polices at all levels: international, national, state/provincial, local or native peoples.
Livelihood, economics and other incentives	Using economic and other incentives to influence behaviour.
External Capacity Building	Building the infrastructure to do better conservation.

*(Salafsky et al., 2007)

These categories and their actions were sourced from a paper published in 2007, which created a standard lexicon for biodiversity conservation, where classifications of threats and actions were clearly defined (Salafsky et al., 2007). This lexicon was used to support trends which create standardised practices within conservation, so that future studies related to this field can be easily compared, and to create clarity of definition and meaning.

3.5 Response bias

The scoping study revealed overwhelming positivity from interviews conducted with staff and trainees about Durrell as an institution. So that impacts did not become overstated, the questionnaire was piloted on 8 people along with two supervisors to clarify linguistic ambiguities, highlights errors and misunderstandings, and test completion times. Leading questions were removed, and questions sections were written so as to start with broad questions before moving towards narrow questions designed to capture conservation and training impact (appendix 1) (Sudman & Bradburn, 1982), as outlined in table 6.

Table 6 Example of broad and narrow question progression

Question	Action	Question Type
1 Did you return to work?	If yes, next question.	Broad
2 Did your roles change when you returned?	If yes, next question.	Broad
3 How did they change?	Select either – Demotion, promotion, decreased or increased responsibility (randomised).	Narrow
4 How was this related to training?	Select either – Directly, somewhat, unrelated, hampered (randomised).	Narrow
5 Did your salary change?	Select either – Decreased, increased, stayed the same.	Very Narrow

Questions where a list of options was provided were also randomised for each respondent to avoid primacy bias. Lastly, questions were designed to be short and the overall questionnaire reduced so that average completion time was 9 minutes, to reduce response fatigue (Newing, 2011).

3.6 Distribution

The final questionnaire was transposed onto Qualtrics, an online survey platform (Qualtrics, Provo, UT). Looping functions designed to present respondents with proceeding questions based on preceding responses were added to the questionnaire (table 6), to make questions relevant to each respondent (Sudman & Bradburn, 1982). A distribution list was developed from a list of historical contacts kept by Durrell since it began training in 1977. This database was cleaned for double entries, deceased contacts, and all undergraduate and postgraduate students trained. This was done to exclude students who attended short discrete courses as part of a university degree, since this was not the purpose of this research. Impacts of post-graduate study in conservation is a research project in and of itself. It would also have been challenging for respondents to differentiate between the impact of Durrell training and training received as part of a degree course. The questionnaire was open between the 8th and 31st of June 2015, a total of 3 weeks, with friendly reminder emails sent out at weekly intervals.

3.7 Data analysis

3.7.1 Entry and Manipulation

Data were organised and managed on Microsoft Excel (2013), and categorised according to the needs of data formatting associated with statistical tests used. All statistical analyses were conducted on RStudio Version 0.99.467 (R Core Team, 2015).

3.7.2 Justifying selection of Variable

Univariates selected for chi-squared testing, where significant variables were then used as explanatory variables within the binomial glms, are outlined in table 7 along with a justification for exploring these variables.

Table 7 Variables selected, along with a brief justification for selection

Country born / Are there differences in perceived impacts of training between developing and developed countries? – Different socio-economic and environmental circumstances between these regions may affect the perceived impact of training.

Decade course attended / The academy has changed its training focus since it started, so does the decade of when a course was attended affect perceived impact of training?

Course category attended / Courses reflect who attends them and what people hope to gain and go on to do, so will this affect the perceived impacts of training?

Organisational Sector / Does already working in conservation affect the perceived impact of conservation training?

Years on job / Increased years in a role usually increase expertise within that role, so do the amount of years within a role affect the perceived impact of training.

Age during course / Age relates to professional experience and knowledge and skills acquired, so does age affect the perceived impact of training?

Duration of course attended / The duration of a course affects how much contact time is held with trainees and in turn how much knowledge and skills can be transferred, so does the duration of a course affect the perceived impact of training?

Employment status / Employment status will affect whether or not trainees can apply what they have learned into behaviour, so does employment status affect the perceived impact of training?

Job Position / Job position will affect the extent to which knowledge and skills learned in training can be applied into behaviours, so does job position affect the perceived impact of training?

3.7.3 Chi-squared tests

A Fishers exact test was conducted to measure the difference in attribution between training impact on individuals, organisations and wider systems. Pearson's Chi-squared tests with Yates' continuity correction were conducted to test the significance of difference in salary increases reported by trainees who received a promotion or increased responsibility as a direct result of training and as somewhat a result of training.

Pearson's Chi-squared test were conducted to test the significance of difference in impact of training on (1.) Actions taken within organisational departments, and departments associated with improving operating capacity and improving conservation capacity within an NGO, and (2.) Actions taken within biodiversity conservation areas. Unrelated and negative impacts of training were aggregated where needed, as both categories often contained only a very small number of responses.

Chi-squared tests were conducted on all univariates (table 7) selected for model fitting in species management and education & awareness, to test the significance of difference in positive or negative attribution to impacts of training reported. Groups were aggregated where data values were low or zero. Fisher's exact tests were used when sample sizes were small (tables 18&19 appendix 2).

3.7.4 Binomial General Linear Models (GLMs)

Significant values found in univariate chi-squared tests were used as explanatory variables in binomial GLMs for both species management and education & awareness. The first binomial GLM with a logit link was fitted to predict the likelihood of trainees reporting positive impact of training within species management as a function of different demographic and course factors. The maximal model included the following explanatory variables; decade course attended, region born, level of education, employment status and job level.

A second Binomial GLM with a logit link was also fitted to predict the likelihood of trainees reporting positive impact of training within education and awareness as a function of different demographic and course factors. The maximal model here included the following explanatory variables; decade course attended, course category attended, age during course, level of education, years in job, region born and employment status. Many of these variables have been demonstrated to be important determinants of training impact at individual levels (Taschereau, 2008; Heckman, 2000).

3.7.5 Model Simplification and Illustration

All models were simplified using the `drop1` function and then analysis of deviance was used to test significant factors to further reduce the models. Models were plotted using the graphic package `gglpot2`.

3.8 Ethics

3.8.1 Scoping Study

All participants were provided with an information sheet prior to participating in the interviews, outlining the research objectives of the study along with the implications for participating. Participants were guaranteed anonymity due to the potential sensitive nature of responses and opinions, and sent a follow up *thank you* email for participating, along with a soft copy of the information sheet originally provided. Free, prior and informed consent was then obtained in writing at the start of the interview, along with permission to use anonymous quotes where needed. Participants were also offered the opportunity to receive a final report of findings upon project completion.

3.8.2 Questionnaire

Respondents were provided with limited information regarding the nature of study within the first two questions of the questionnaire, and assured of the confidentiality of their responses. This was needed in order to avoid positive response bias from respondents, as demonstrated by the scoping study. Respondents were provided with full information about the study and the implications of participating once the first two questions were answered (see appendix 1). All respondents were given a *thank you* message and offered the opportunity to receive a final report about the study upon completion. All other ethical considerations were met according to the Imperial College ethics guidelines.

4 RESULTS

4.1 Data availability

A total of 1,917 emails were on record of the 2,954 people stored in the entire database kept by Durrell. Missing email addresses of 1,037 people from this database were manually searched for on google, producing an additional 134 email contacts used in the questionnaire. Of the 2,051 people emailed for participation in the questionnaire, 327 fully completed questionnaires were received, representing a completion rate (of the 980 people who opened the email), of 33%. The majority of responses received in this study came from respondents who attended courses provided by the academy in 2000-2009 (n=96) and from 2011-2015 (n=143) (fig. 4).

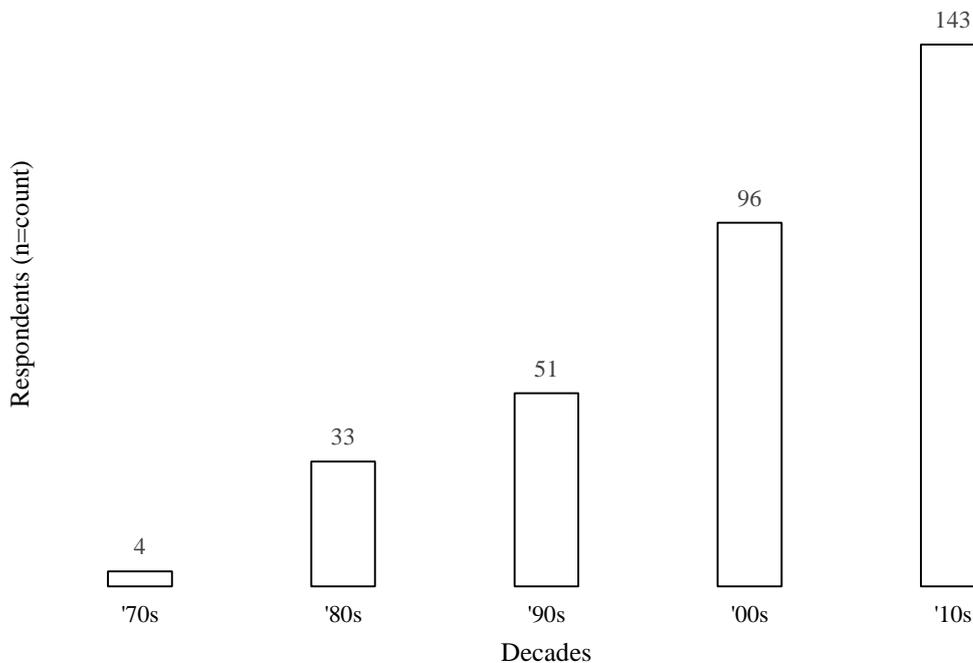


Figure 4 Trainee course attendance among respondents by decade (n=327)

4.2 Trainee profile

As summarised in table 8, the majority of trainees come from Europe, primarily Britain, followed by India and Brazil. Most trainees are aged 26-34 years old and hold a bachelor's degree. Trainees report working primarily full-time, occupying mid-level roles in organisations that work within the conservation and wildlife sector.

Table 8 Summary of trainee demographic profile collected

Variables	Level	n
Age (years)	18-25	83
	26-34*	157
	34-54	70
Regional Nationality	European (British)*	67
	Asian (Indian)	21
	Latin American & Caribbean (Brazilian)	20
Education	Secondary	54
	BSc*	160
	MSc	92
	Doctorate	18
Employment status	Full-time*	183
	Part-time	49
	Unemployed	95
Organisational Sector	Conservation and Wildlife*	141
	Other	17
	Environmental Education	9
	Research	9
Employment Level	First-level	76
	Mid-level*	100
	Senior-level	37

*Majority counts highlighted

4.3 Course attendance

A total of 37 different courses offered by the Academy throughout its history were categorised into the following 6 groups (table. 9)(full list found in appendix 4, table 22).

Table 9 Number and proportion (%) of courses within each group

Course class	n	%
Conservation	10	27
Education	4	11
Hobbyist	3	8
Husbandry	8	21
Management	8	22
Other	4	11

The academy has offered an almost equal proportion of courses related to conservation, management and husbandry (table. 9), despite this, respondents attended a higher number of courses related to conservation (n=200), followed by courses involved with husbandry (n=62) and then management (n=33) (figure 5).

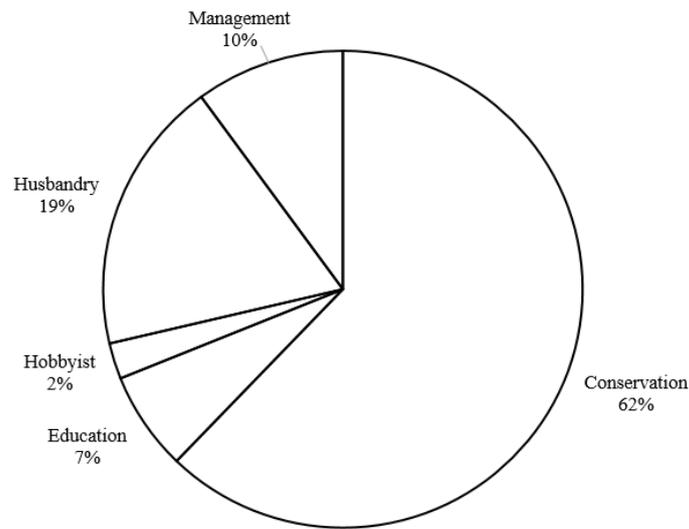


Figure 5 Proportion of respondent attendance within course classes (n=327)

4.4 Impacts of training in conservation

The overall conservation impacts of training are summarised in figure 6. Trainees report a higher proportion of very positive impacts of training in organisations and wider systems than amongst themselves as individuals, however these differences are statistically insignificant ($p=0.275$).

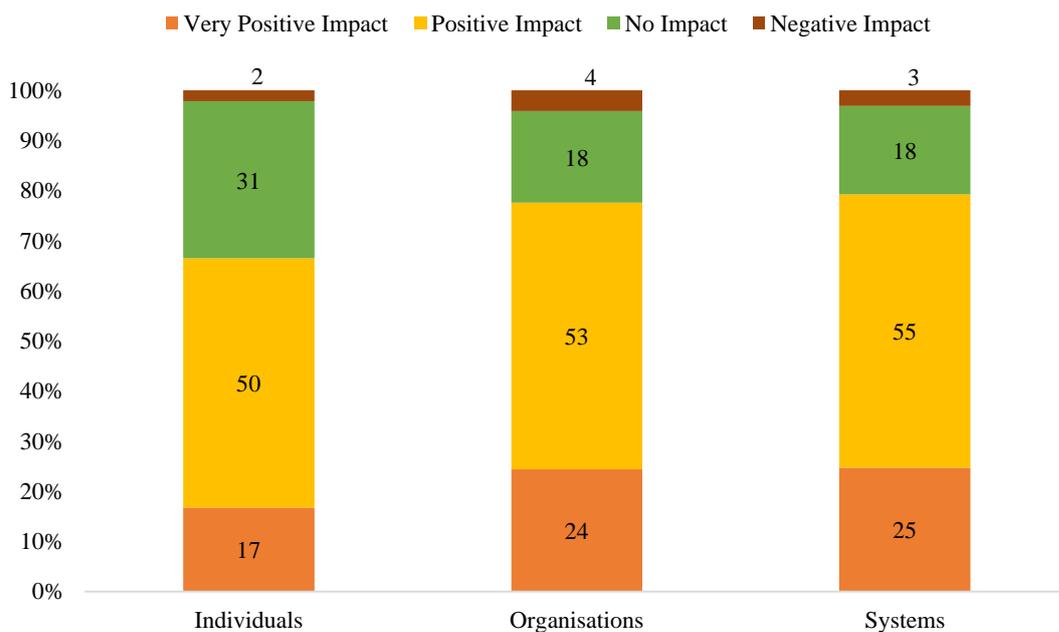


Figure 6 Overall impact of training on individuals, organisations and wider systems (%)

4.5 Individual impacts of training

4.5.1 Post-course events

Of the trainees who were employed during a course, the vast majority reported returning to work after finishing a course (91%, n=208). The remainder report immediately starting work elsewhere whilst 4 people report starting education. Fifty-five percent of unemployed trainees report starting work immediately after finishing a course whilst the remainder go on to starting further education (table 10).

Table 10 Events reported by trainees who responded to post-course questions (n=303/327)

Of people employed (n=228)	n	%
Return to work	208	91
Start work elsewhere	16	7
Start education	4	2
Of people unemployed (n=75)		
Start work	41	55
Start education	34	45

4.6 Personal Development

4.6.1 On starting work

Of the trainees who started work, or started working elsewhere, a majority report starting working for established organisations (n=43/57), whilst 6 individuals report starting their own organisations. A minority of individuals attribute starting work directly to having received training (16%), followed by 35% who say training had somewhat of an impact on starting work for an established organisation, whilst the majority report that this employment was unrelated to having received training at all (47%) (figure7). The remaining 2% felt that training had a negative impact on their post-course employment possibilities.

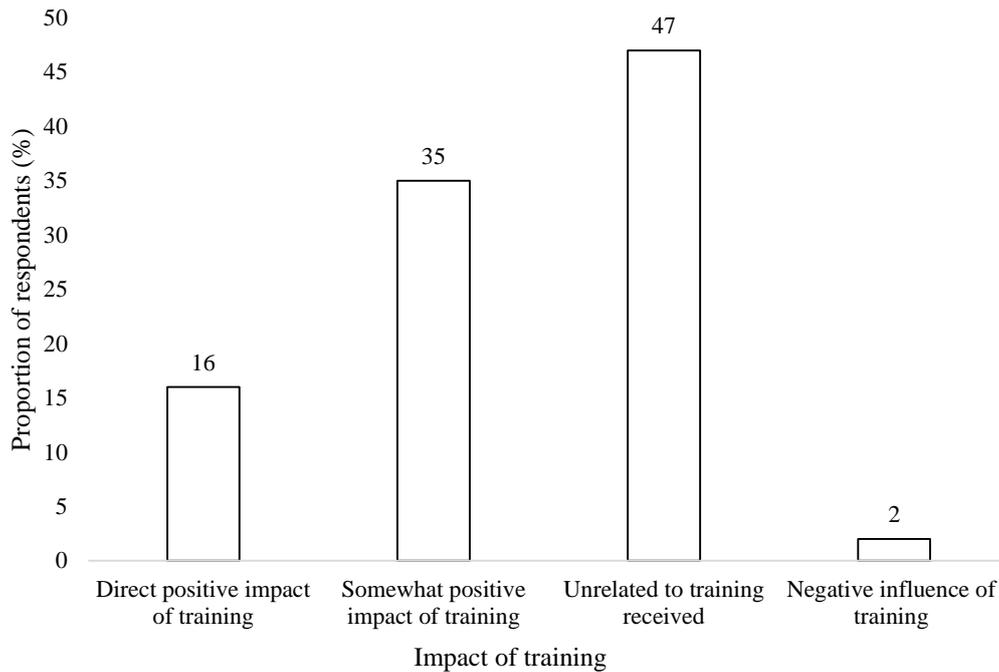


Figure 7 Impact of training on starting work (%)

4.6.2 On starting further education

Of the 34 individuals who report starting education after attending training, an equal proportion report that this was somewhat related to, or unrelated to training they received (44% each). A small number of respondents report that starting further education was directly as a result of training (9%), whilst the remaining respondents report that training had a negative impact on them starting further education (3%). No significant difference was found between the impacts of training on starting work and starting further education ($p=0.3229$).

4.6.3 On returning to work – roles changes (n=107/208)

Fifty-one percent of trainees experienced some form of role change upon returning to work after training. Most respondents report gaining increased levels of responsibility (55%, $n=59$), followed by respondents who received a promotion (42%, $n=45$). The remaining 3% of respondents were either demoted or given fewer responsibilities upon returning to work. Of the trainees who received more responsibility or a promotion, 18% report that this was as a direct result of training received, whilst 59% report that this was somewhat as a result of training. Twenty percent of trainees report that these outcomes were completely unrelated to the training they received. The individual who received a demotion said that this was as a direct result of training, whilst the two individuals who received fewer responsibilities said that this was somewhat as a result of training received.

4.6.4 Salary Change

Of the individuals who received a promotion or increased responsibilities as a direct result of training, 67% received an increase in salary whilst 33% reported no change in salary. Of the individuals who received a promotion or increased responsibilities somewhat as a result of training, 56% gained an increase in salary whilst 44% experienced no change. This would indicate that individuals who gain positive roles changes such as increased responsibilities and promotions, and who attribute these roles changes directly to training received, appear to gain salary increases more than those who attribute these changes somewhat to training received, although the differences are statistically insignificant ($\chi^2 = 0.287$, $df=1$, $p=0.592$).

4.6.5 Partnership/Initiatives with peers

Eighty-four out of 327 people reported creating partnerships/initiatives with people they met on the course. Respondents were asked to provide the names of the people they made partnerships/initiatives with. A total of 83% of names provided were found to match the historical database maintained by Durrell, either fully or partially (partial matches were marked when details such as year and name spelling were inconsistent with the record). The majority of these partnerships/initiatives were categorised as either conservation related, work related or information sharing related (figure 8).

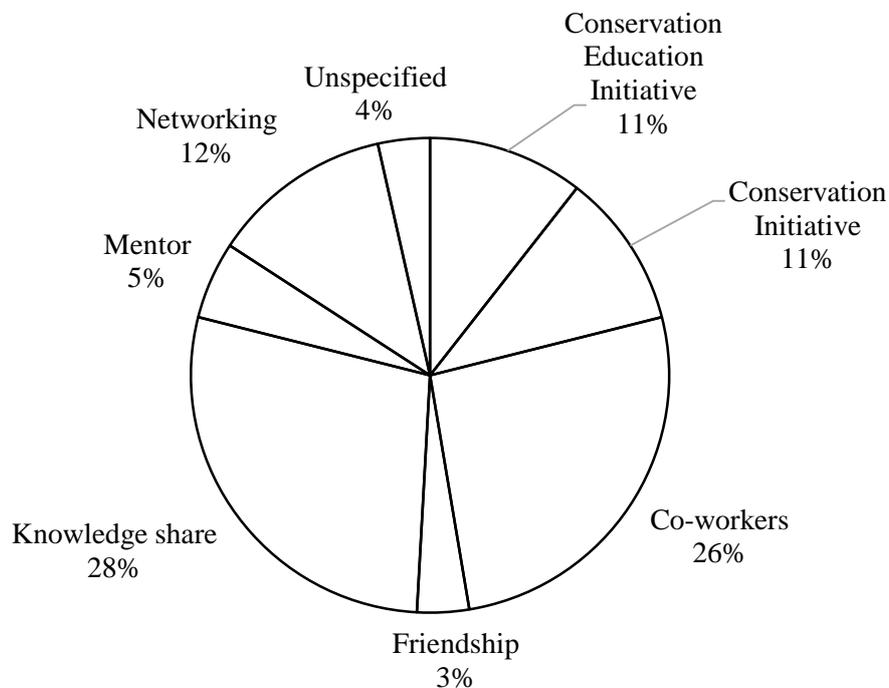


Figure 8 Types of partnership/initiative created with peers not known before meeting on course (n=57)

Most of the respondents who reported a partnership or an initiative arising from the course stated that this comprised sharing knowledge (n=16), followed by respondents who established co-worker relationships (n=15). All of these individuals did not know each other before meeting during training. It is appropriate to assume that these impacts would therefore not have occurred, had training not facilitated the networking of these individuals at the academy, so can be fully attributed as impacts of training received.

4.6.6 Language

Respondents were asked to state their level of English language proficiency before and after attending a course. A total of 34 respondents report an increased level of proficiency, whilst the vast majority report no change (n=247).

4.7 Organisational Impacts of training

Five hundred and thirteen responses were recorded from trainees who report using knowledge and skills learned in training within their organisations when returning or starting work (more responses were received than the number of respondents, since multiple choices could be selected). The majority of responses received came from actions taken within departments working on Research and Development (35%), closely followed by actions taken in Public Engagement (17%), and Management (16%)(table 11).

Table 11 Number of responses received for actions taken within different organisational departments.

Department	n
Marketing	17
Accounting	30
Human Resources	63
Logistics	65
Management	80
Public Engagement	86
Research and Development	182

The impacts of training on different departments are outlined in figure 9. The “negative impacts” of training were aggregated with “no impacts” of training in order to conduct analyses to compare differences of training impact between departments (negative impacts represented on average 6% of responses within the “no impacts” category). Statistically significant differences were found between the impacts of training on different departments ($\chi^2 = 25.695$, $df=12$, $p=0.011$).

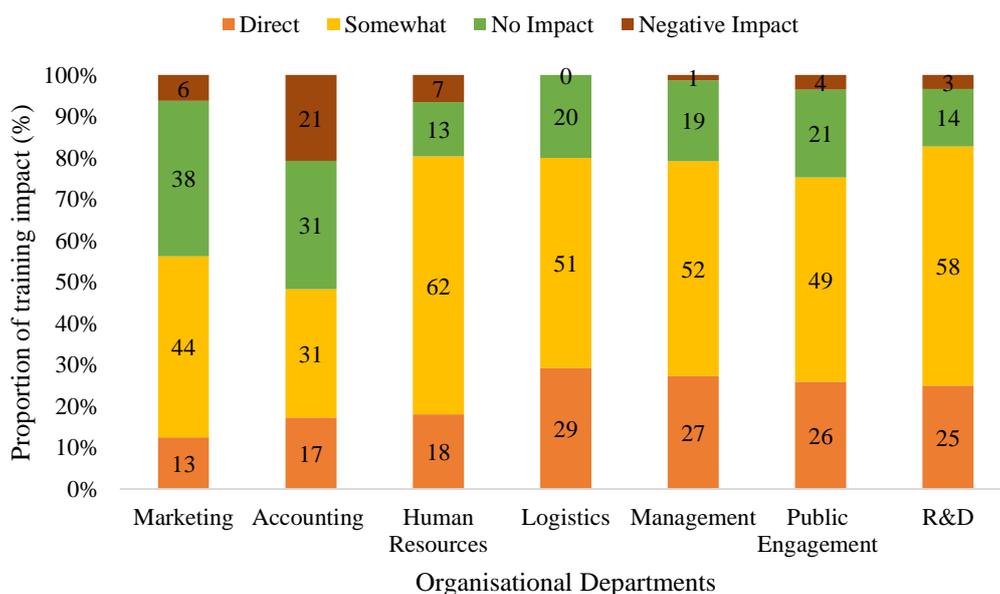


Figure 9 Proportion of impact of training based on – direct result of training, somewhat as a result of training, no impact of training and negative impact of training - on actions taken within organisational departments.

Training had the greatest direct impact on actions taken in logistics (29%), followed by management (27%) and public engagement (26%). Training had the least impact within marketing (38%) and the highest negative impact within accounting (21%). The highest proportion of actions taken somewhat as a result of training occur in human resources (62%). These departments were further divided up into two categories in order to evaluate differences of training impact when looking at improvements to the operating capacity of an NGO and when looking at improvements to the conservation capacity of an NGO (table 12).

Table 12 Overview of organisational departments sorted according to improving operating capacity and improving conservation work within an NGO

Improved Organisations*	Improved Conservation**
Accounting and Finance	Public Engagement
Human Resource Management	Research and Development
Marketing	
Management and Administration	
Logistics	

*Categories associated with improving the operational capacity of an organisation as a whole.
 **Categories associated with improving the capacity of an organisation to conduct conservation work specifically.

Forty-eight percent of responses were associated with taking actions to improve the operational capacity of an NGO whilst 52% were associated with improving the conservation work within an NGO. The impact of training towards these two groups is summarised in table 13.

Table 13 Summary overview of impact of training towards NGOs

Impact of training	Operating capacity (n=248)(%)	Conservation capacity (n=265)(%)
Direct result	23	25
Somewhat as a result	51	55
Unrelated	21	16
Hampered	5	4

No significant differences were found between the impact of training attributed to departments associated with improving operating capacity and those associated with improve conservation capacity within an NGO ($\chi^2 = 2.519$, $df=3$, $p=0.471$).

4.8 Biodiversity Impacts of training

Respondents were able to select multiple areas within biodiversity conservation where they had taken actions associated with improving biodiversity. A total of 454 responses were received, the majority highlighting actions taken in species management (n=167) and education & awareness (n=128) (table 14). Overall, the differences between impacts of training attributed to different biodiversity areas were statistically significant ($\chi^2=22.651$, $df=10$, $p=0.012$).

The majority of trainees report that actions taken within different biodiversity areas were somewhat as a result of training received, where most trainees took action within education & awareness (28%) and species management (28%) as a direct result of training. Livelihoods and Economics was the least positively impacted by training, and also the area where trainees took least action directly as a result of training. The highest proportion of actions taken somewhat as a result of training occur in Law and Policy (64%) (figure 10).

Table 14 Responses received for actions taken within biodiversity areas (n=454)

Biodiversity Areas	Total
Livelihoods and Economics	22
Law and Policy	40
Land/water protection/management*	47
Capacity Building	50
Education and Awareness	128
Species Management	167

*Land/water protection and land/water management were aggregated into one category for analysis.

The biodiversity areas of species management, and education & awareness were the focus of statistical analyses for measuring the conservation impact of training within biodiversity, given that they were the areas in which most actions had been taken as a result of training (table 14).

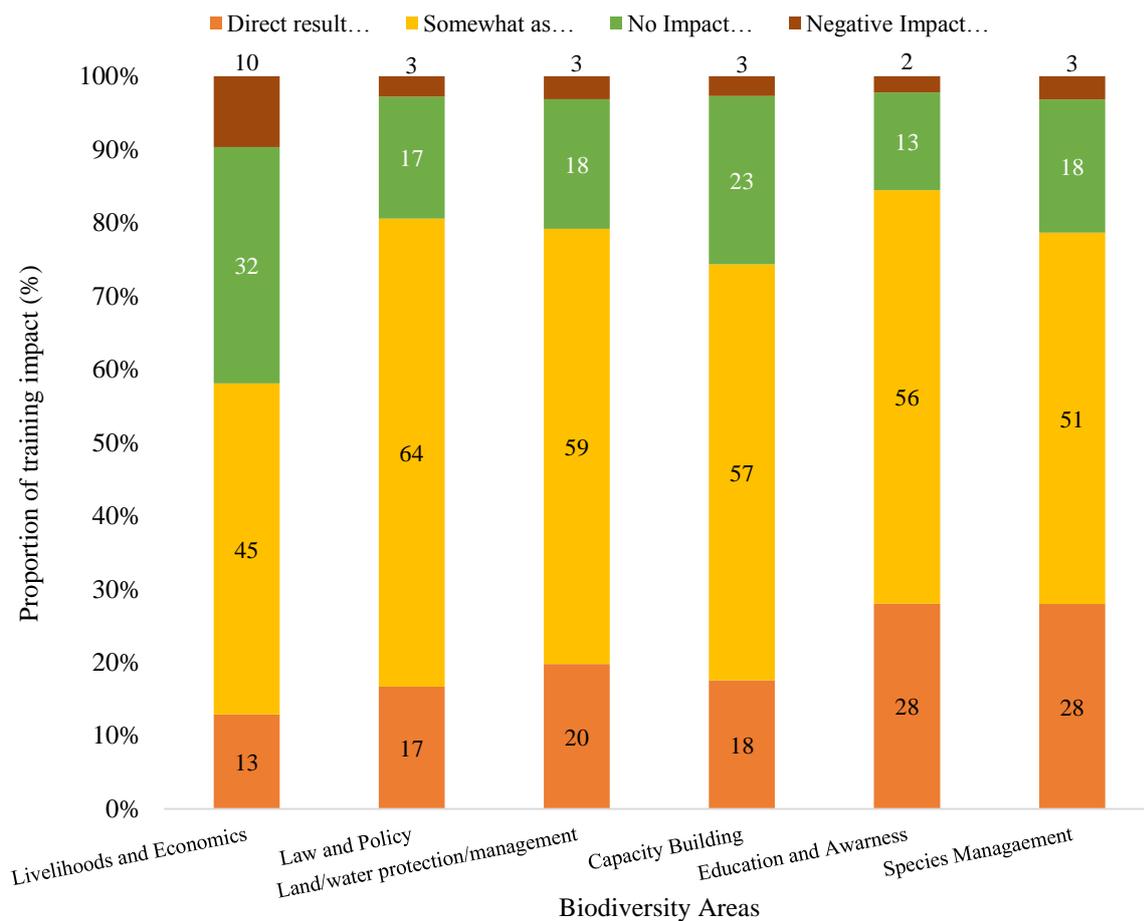
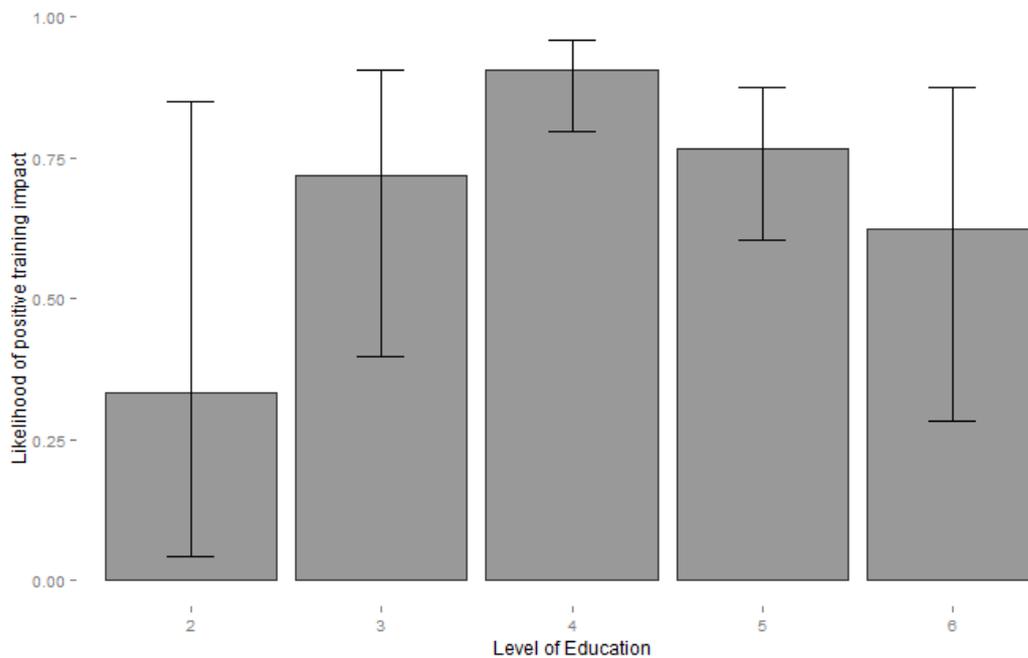


Figure 10 Proportion of impact of training based on – direct result of training, somewhat as a result of training, no impact of training and negative impact of training - on actions taken within biodiversity conservation areas.

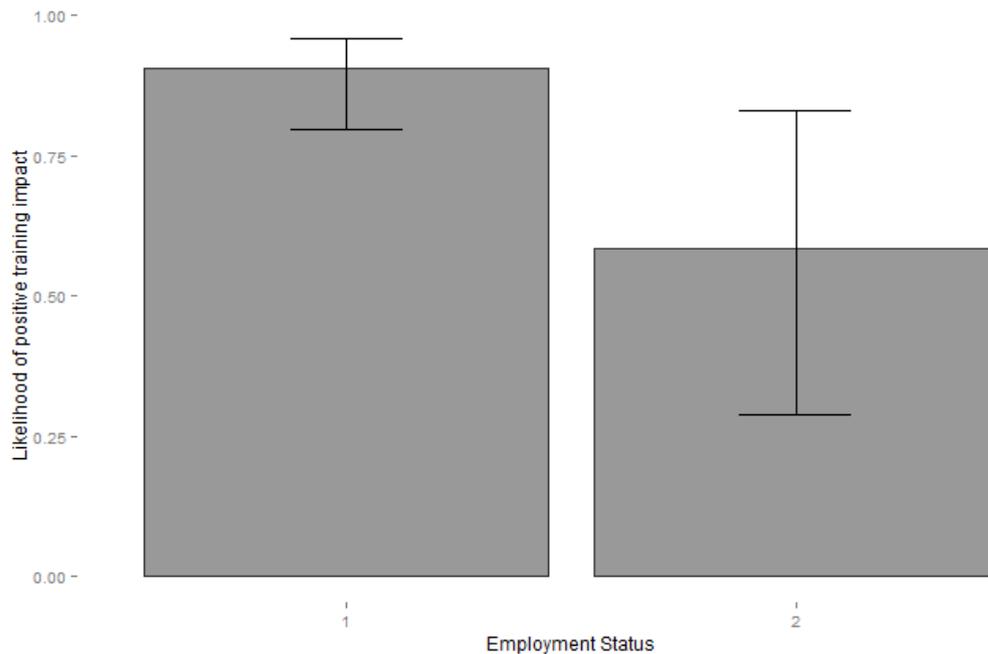
Chi-squared tests were conducted to investigate the prior effect of training impact on each independent variable used for model fitting in species management and education & awareness. The variables selected were then put into each global binomial glm and reduced using the drop 1 test in R, until the minimum adequate model including only significant variables was obtained (see appendix 2, tables 18&19).

4.8.1 Binomial GLM on the impacts of training for Species Management

The final model included only main effects for the level of education prior to attended a course ($\chi^2=10.50, p < 0.062$) along with the trainees' employment status whilst attending a course ($\chi^2=9.293, p < 0.002$)(figure 11 a. and b.)



(a) **Level of Education.** Controlling for employment status. Education Level Categories (2.) Secondary, (3.) High School, (4.) BSc, (5.) MSc, (6.) Doctorate, (7) Self-taught.



(b) Employment status. Controlling for level of education. Employment categories (1.) Full-time (2.) Part-time.

Figure 11 Probability of trainees reporting a positive impact of training on species management as a function of (a)(b). Predictions of binomial generalised linear model are shown with 95% confidence intervals.

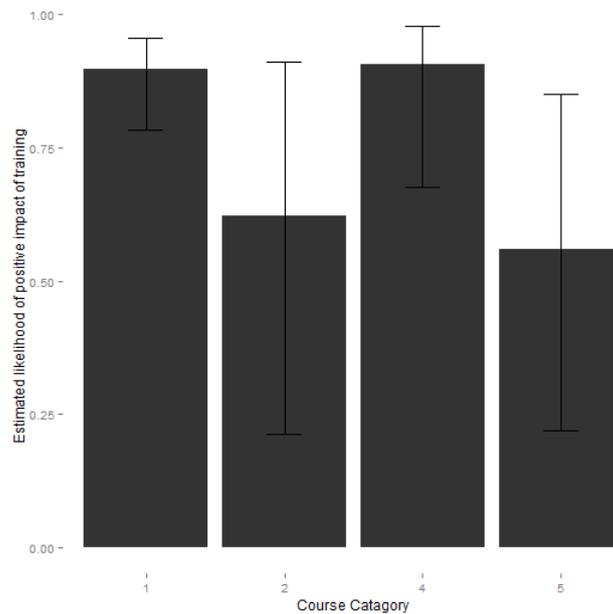
Compared to trainees with a secondary education whilst attending a course (baseline), those trainees who had a bachelor's degree whilst attending a course were significantly more likely to report a positive impact of training on species management, and the probability to report a positive impact of training significantly decreased for trainees in part-time employment, compared to those in fulltime employment (table. 15).

Table 15 Model Coefficients, standard errors and significance tests for a generalised lineal model with binomial errors for the likelihood of reporting a positive impact of training on species management.

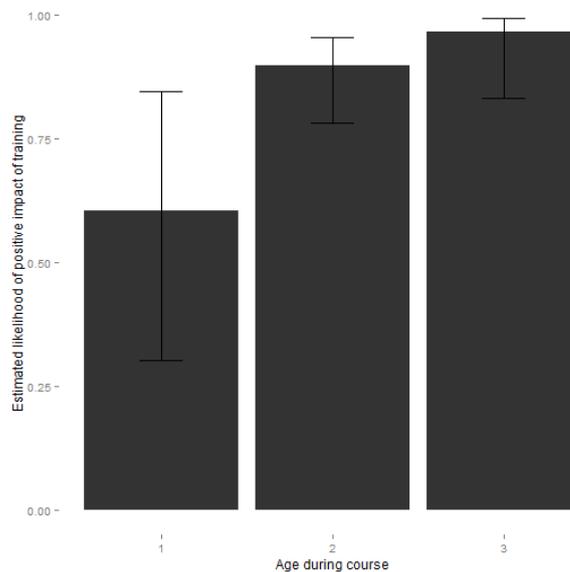
Coefficients:	Estimate	Std. Error	z value	Pr(> z)	Significance
Secondary Education + Fulltime Employment (Intercept)	-0.6931	1.2247	-0.566	0.57143	
High School Education	1.6254	1.4012	1.16	0.24605	
Bachelor's Degree	2.959	1.307	2.264	0.02358	*
Master's Degree	1.8806	1.2837	1.465	0.14291	
Doctorate Degree	1.204	1.4259	0.844	0.39848	
Self-taught	18.128	1246.823	0.015	0.9884	
Employed Part-time	-1.9213	0.635	-3.026	0.00248	**

4.8.2 Binomial GLM on the impacts of training for Education and Awareness

The final model included only main effects for the category of course attended ($\chi^2=10.45, p < 0.033$) and age during course ($\chi^2=11.32, p < 0.010$)(figure 12 (a)(b)).



(a) Course category attended. Controlling for the age during course. Course categories (1.) Conservation, (2.) Education, (4.) Husbandry, (5.) Management.



(b) Age during course. Controlling for course category attended. Age categories (1.) 18-25, (2.) 26-34, (3.) 35-54.

Figure 12 Probability of trainees reporting positive impact of training on education and awareness as a function of (a)(b). Predictions of binomial generalised linear model are shown with 95% confidence intervals.

Compared to trainees attending conservation related courses (baseline), those trainees who attended management courses were less likely to report a positive impact of training on education and awareness, and the probability to report a positive impact significantly increased with age (table 16). The high estimate and no significance for the age group of 55-64 is most likely related to the small sample size in this group (n=33) compared to the sample sizes found in ages 26-34 (n=94) and ages 35-54 (n=173). A summary of all the results obtained for the impacts of training on individuals, organisations and wider systems are outlined in table 17.

Table 16 Model Coefficients, standard errors and significance tests for a generalised lineal model with binomial errors for the likelihood of reporting a positive impact of training on education and awareness.

Coefficients:	Estimate	Std.Error	z value	Pr(> z)	Significance
Conservation Course + Ages 18-					
25 (Intercept)	0.42679	0.63787	0.669	0.50345	
Education Course	-1.66816	0.96106	-1.736	0.08261	.
Hobbyist Course	-19.9103	2399.545	-0.008	0.99338	
Husbandry Course	0.09163	0.80227	0.114	0.90907	
Management Course	-1.92976	0.82428	-2.341	0.01922	*
Ages 26-34	1.74062	0.69011	2.522	0.01166	*
Ages 35-54	2.91744	1.00966	2.89	0.00386	**
Ages 55-64	16.13928	1696.734	0.01	0.99241	

Table 17 Summary table of impacts of training on individuals, organisations and wider systems.

Impact	Direct Impact	Somewhat Impact	No + Negative Impact
	% impact of training		
Overall impact of training on individuals	17	50	31 + 2
Overall impact of training on organisations	24	53	18 + 4
Overall Impact of training on systems	25	55	18 + 3
Differences are insignificant (p=0.275)			
Individuals			
On starting work (section 4.6)	16	35	47 + 2
On starting further education	9	44	44 + 3
No significant differences found p=0.3229			
Roles changes upon returning to work (51%, n=107 did)			
Promotion (42%, n=44)	9	57	32 + 2
Increased Responsibility (55%, n=58)	24	59	16 + 1
Demotion (1%)	✓		
Decreased Responsibility (2%)		✓	
Promoted/increased responsibility directly because of training - 67% salary increased, 33% no change			
Promoted/increased responsibility somewhat because of training - 56% salary increased. 44%			
No significant differences between impact of training on salary changes (p=0.59)			
Partnership created (26%)	✓		
Language Improved (12%, n=34/281)	✓		
Language stayed the same (89%, n=247/281)			✓
Organisations			
Overall differences in training impact in organisational departments statistically significant (p=0.011)			
Organisational Operating Capacity	23	51	21 + 5
Organisational Conservation Capacity	25	55	16 + 4
No statistical differences observed between training impact in organisations between two groups – unexpected			
Systems			
Overall differences in training impact in biodiversity areas statistically significant (p=0.012)			
Actions in Species Management	28	51	18 + 3
Positive impact of training on species management influenced by education + employment status			
Actions in Education and Awareness	28	56	13 + 2
Positive impact of training on education and awareness influenced by course + age			
Somewhat expected - training does have an impact on areas related to species management + but also areas related to education & awareness – unexpected.			

5 DISCUSSION

The pressures associated with the loss in global biodiversity continue to increase, placing increased pressure on conservationists to improve their approaches to reducing these losses (Butchart et al., 2010). Conservationists are increasingly turning to capacity building as a way of gaining local support for their interventions, and in an effort to create sustainable solutions for conservation practise (Fairburn, 2013; Butchart et al., 2010). One essential step for training to be successful as a strategy for capacity building, is to demonstrate that learning is occurring amongst trainees, which is best achieved by recording changes in behaviour which occur post-training (Kirkpatrick & Kirkpatrick, 1994). This study achieved this by evaluating perceived changes which have occurred to trainees as individuals, within their organisations and through wider systems. The findings here related back to similar findings in other fields, where reducing knowledge and skills gaps has been show to reinforce human capital, increase productivity and reduce poverty (Heckman, 2000; Taschereau, 1998; Psacharopoulos, 1995). Here, training is conducted under the assumption that it will improve a conservation practitioner's ability to conduct her/his work, and as a result, improve their ability to save threatened species from extinction.

Training was shown to have a positive impact on the way trainees conducted themselves upon returning to work, which has important implications for Durrell, as it demonstrates that learning is being transferred into job effectiveness post training, and as such can be a reflection of effective training strategies at the academy. These findings also support literature on how individual impacts of training present themselves, usually outlined in the form of improvements to job performance and output. Here, increased responsibility, promotions and salary increases were used as indicators for this (Arguinis & Kraiger, 2009; Hill & Lent, 2006; Arthur Jr et al., 2003). One third of all actions taken to improve organisational departments were within Research and Development alone, representing benefits of training which support the literature describing improvements to operating quality (Collins & Holton, 2004). Research and Development often lies at the very core of successful conservation interventions, where monitoring biological diversity is often conducted in order collect information about a particular species or a particular state of nature at a particular or multiple points in time (Yoccoz, Nichols & Boulinier, 2001). These are often associated with a need to meet scientific objectives but also to monitor management objectives, where such actions can lead to improved

understanding and in turn improved responses about how to move forward with a particular intervention that has perhaps not produced its desired outcome (Yoccoz, Nichols & Boulinier, 2001). This is encouraging for training providers such as Durrell, as it may also imply that training is not only being transferred into behaviours, but that knowledge and skills are being transferred from trainees to colleagues post-training, as these activities are typically conducted collaboratively.

5.1 Training and Biodiversity Conservation

Trainees at the academy went on to work in a wide range of areas post-training, and training had significant impacts within each of these areas. As was expected, given that Durrell's approach to conservation is primarily species focused (Durrell, 2015), many trainees went on to work in Species Management. Whilst there is an ongoing push to diversify training away from the focus of captive breeding and animal management which was common in Durrell's early history (Waugh, 1980), and more towards training which offers a full spectrum of modules related to conservation science (Jamie Copsey, 2015, *pers. comm*), further study is needed to evaluate what kind of Species Management trainees go on to work with. This would be valuable to understand, as contemporary approaches to species management include a wide range of activities associated with species recovery, invasive species control and species reintroductions. These activities would also reflect Durrell's ongoing work in its field programs, which it often links into its teaching as case studies at the academy. This would highlight whether this push to offer a broad range of teaching in conservation is being translated into changes in behavioural outcomes associated with species conservation.

Perhaps rather encouragingly, and unexpectedly, many trainees also go on to work within areas related to Education & Awareness. The academy is by definition, an institution of education and training, so perhaps it should come as no surprise that many trainees leave with new insights into how to communicate and run education programs after visiting Durrell. This area does seem to be disproportionately represented in what trainees go on to do however, and the reported impacts of training are particularly high in this area. The academy has only offered 4 courses specifically related to education throughout its history, and only 7% of all respondents in this study attended courses related to education. Despite this, 28% of all responses received were for actions taken in Education and Awareness, and of those responses, 28% of respondents attribute these actions directly to training received. These

impacts are high when compared to similar responses reported on actions taken in Species Management, which represented 36% of all actions taken, with 28% of those attributed directly to training. The highest proportion of courses offered at the academy are categorised as conservation related (27%), and these represented the highest proportion of courses attended by respondents in this study (62%). So when compared to Species Management, it would seem that Durrell is having a greater impact on people taking actions related to Education and Awareness. This perhaps illustrates the value of Durrell offering a broad range of modules within some of its more championed courses. This is the case with the DESMAN course for example, where modules are presented on topics related to the psychology of conservation education, and on how to convey conservation messages, however what appears to be important, is that a course does not have to target education specifically, in order to achieve an understanding of conservation education. It would appear that people are perhaps utilising the knowledge and skills learned in both education modules and non-education related modules, such as those found in the DESMAN course, and applying them to education and public outreach activities related to the conservation work they do. The actions taken within Education and Awareness may also reflect the importance of this field for conservation in general, and a need to improve knowledge and skills related to this, to increase outreach and education programs so that public support for conservation can be gained (Mace et al., 2007; Brewer, 2002).

5.2 Study limitations and scope for further study

Capacity building through training has been an important strategy for Durrell since it opened the academy in 1977, where its first trainee from the Island of Mauritius attended an 11 month course in captive breeding and animal husbandry. Durrell has undergone a lot of change since then, both in its wildlife park and the academy. Amongst these changes is an increased willingness to evaluate the impacts of its conservation work (Young et al., 2014), and now also the impacts of training at the academy.

This study was limited by a lack of data for many of the impacts evaluated on individuals in particular. Small sample sizes coupled with selection bias may have skewed the results obtained. For example, fulltime employment status was a significant predictor of reporting a positive impact of training on species management, however this may simply be a reflection of participant selection bias. Perhaps people who were employed fulltime were somehow better at their jobs than people employed part-time, and so were predisposed to using training

more effectively, and as a result, reported a more positive impact of training. This trend is also reported in the literature, which suggests that training has a greater impact on individuals when course content is made specific and placed into specific context of the needs of the trainees (Taschereau, 2008). The same could be said about the likelihood of reporting a positive impact on species management based on level of education. Individuals with doctorate degrees were less likely to report a positive impact of training than those with high school degrees. Although this may be the case in reality, it could rather merely be as a result of a very small sample size in this group compared to other groups. Whilst correcting for these effects in this study was not possible due to the lack of a counterfactual group, it is important to highlight that these effects may play a role in the findings obtained, and how they are used by Durrell in any future adaptive management plans.

This study has outlined the conservation impacts which occur after training, which can now be used in future studies as guide for “where to start looking”, for conservation NGO’s who may wish to evaluate how their interventions are having an impact on specific factors related to individuals, organisations and wider systems. This study also suggested the use of Kirkpatrick’s four-level training model as a way to evaluate training in future interventions. Whilst the focus here was on evaluating the impacts according to levels three and four of the model, the true value of this model lies in its ability to outline impacts across all four levels, and increase cause-and-effect inference when appropriate data is collected at all stages, so that statistical analyses can be conducted for more robust inference of impact. This would be valuable for Durrell to do in future research, where linking training to all stages of the model could produce more robust forms of inference. Some have however criticised this model for this overreliance on these assumed causal linkages between levels, stating that there is limited evidence which supports the linear causality suggested by Kirkpatrick (Bates, 2004).

Numerous other models and methods exist which are used to evaluate training impact to a similar degree as Kirkpatrick’s four-level model (Zinovieff & Rotem, 2008). Despite this, the four-level model’s popularity has remained consistent over the past 30 years, and continues to be used by both public and private sector organisations, suggesting that it must fulfil the needs of many people conducting training impact evaluations (Bates, 2004).

5.3 Implications of findings for Durrell

This study outlined the factors related to increasing the likelihood of reporting a positive impact of training on species management and education & awareness, however it is

important for Durrell to consider the repercussions of these findings before it uses them in any form of adaptive management. Durrell could use these results to increase its impact on actions taken within species management, by selecting candidates that hold Bachelor's degrees or higher, and who are in fulltime employment. Whilst this may seem like an obvious step to take, there may be implications of doing this. For example, many of the places which still host a rich array of biodiversity are also some of the poorest and least economically developed places in the world (Brooks et al., 2006). It should be a priority to build capacity through training here, where people who live close to this biodiversity have the greatest possibility to preserve it long into future, simply by the added advantage of living close to these places. Selecting individuals on the basis of their level of education could have unintended consequences for future conservation interventions, as it would exclude such people, who are typically not well educated, from receiving essential conservation training, which raises the question of what can be done to increase the impact of training for these individuals?

Similar implications could be drawn for Education & Awareness. Increased age was one factor shown to increase the likelihood of reporting a positive impact of training on actions taken in Education & Awareness. Whilst issues have been outlined regarding sample sizes in this study, the literature does support the notion that training younger people does create greater impacts (Taschereau, 2008; Palmer, 2005; Heckman, 2000). One example of this can be seen in The Roots & Shoots program by the Jane Goodall Institute. Whilst education programs do technically differ from discrete training courses, and with little literature on what impact this program has had on biodiversity, what is certain is its impact on raising awareness about conservation and empowering young people to take responsibility for their environment. It offers a curriculum for a wide range of people by providing them with context and cultural specific learning materials (Hudson, 2001). This program has been shown to foster increases in knowledge about conservation, improve personal and social development and raise community awareness about conservation in communities which live close to national parks and wildlife sanctuaries (Johnson-Pynn & Johnson, 2005). Once again, excluding people on the basis of young age could have long-term negative impacts on fostering environmental engagement in individuals who may aspire to become conservationists in the future. Working with children may be something that Durrell could move into in the future, although courses would have to be significantly tailored to the needs and learning capacities of these age

groups. This could however be another step for Durrell as it expands its ambition to increase its conservation training impact through its training Network.

5.4 Moving forward with Training Impact Evaluation

Durrell could gain from conducting regular training evaluations in a number of ways, as outlined in the previous literature on monitoring and evaluation. Evaluations should however be deliberate and purposeful (Margoluis & Salafsky, 1998), and perhaps when coupled with these three recommendations, could offer Durrell the opportunity to better evaluate, understand and increase the impacts of its training, to later develop a Durrell Index for Training Impact in Conservation.

5.4.1 Data Collection – the ultimate Key Stone

Collecting data before and after training could add value to training in a simple way. Understanding the extent to which trainees have acquired knowledge and skills is the first step in predicting if knowledge has the possibility of being transferred into behaviour upon returning to work. This would also give Durrell the possibility to adapt its course materials by responding to the prior knowledge of trainees, where a deeper learning context could then be applied in order to increase training impact, as outlined in the literature. Gathering good data can also help improve training courses if they are shown to have no impact on learning, and help decide on whether a program merits continuation or not (although perhaps this is not always feasible as some courses are maintained or dropped on the basis of consumer demand).

5.4.2 Reinforce level 3 of Kirkpatrick's Four Level model through the Durrell Network

Whilst this is the first real step in evaluating whether knowledge is being transferred into actions which change behavioural outcomes, this step is often beyond the influence on training providers, and usually left to the individual upon returning to work. If training is not being applied when trainees return to work then what good is training at all? Durrell could use the Durrell Network more effectively to support trainees in conservation learning throughout their conservation careers. It would also allow it to keep in close contact with active members, to better evaluate level 4 concerned with measuring quantifiable impacts of training in wider systems.

5.4.3 Create training partnerships with recipient NGOs

Creating clear training links with other NGOs would allow Durrell to further its desire to build capacity through training within organisations. More importantly however, is that it would allow Durrell to link strategic learning needs with effective ways of evaluating training impact, by recruiting the line managers of conservation practitioners it has trained, who could evaluate the impacts of training on job performance and output. Durrell would have good scope to do this its partner in Mauritius - the Mauritian Wildlife Foundation (MWF), and its close collaborator in Brazil, the Instituto de Pesquisas Ecológicas (IPÉ).

5.5 Linking it all Together through a Theory of Change Framework

This study has evaluated the conservation impacts of training at the Durrell Conservation Academy, which can be placed into a broad preliminary training logic model (figure 13).

Inputs	Outputs	Outcomes - Impacts			Impact + mission
	Activities	Short-term	Medium-term	Long-term	
Human Resources / teaching materials, financial support, access to Durrell. Course participants	Training delivery at the Durrell Conservation Academy --- Lectures Discussions Course work Practical exposure Training types.	Increased knowledge and improved skills	Behaviours changed in job – organisational capacity improved	Greater pursuit of activities related to biodiversity conservation – increased effectiveness and success with conservation interventions.	Reduced loss of biodiversity – species saved from extinction.

Figure 13 Summary logic model of assumed impacts of training in conservation

Effective theories of change are outlined by consulting multiple stakeholders within an NGO as it creates consensus about common objectives and appropriate indicators which can be used as measures to evaluate program effectiveness and impact over time (Taschereau, 1998). For the conservation impacts of training, these indicators can be developed at a later stage when results and implications of this study have been received by Durrell. According to this assumed preliminary framework (figure 13), Durrell have achieved outcomes as described within short, medium and long-term impacts associated with training at the academy, as outlined by the findings in this study.

5.6 Closing Statement

For Durrell, whose objective for providing training is to equip conservation practitioners with the skills and knowledge needed to save threatened species from extinction (Durrell Academy, 2015), finding evidence of this is crucial if it is to improve its ability to fulfil this objective. This study has provided some evidence of this, and offered some insights into the scientific and conceptual challenges associated with evaluating training impacts, but also provided evidence of the value added in doing so. This study can act as a small starting point for Durrell to improve its training practise, so that it can continue to build capacity through training efficiently, and above all sustainably, by providing people with the knowledge and skills needed to conduct conservation work effectively and independently in the future.

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APPENDICES

Appendix 1 – Questionnaire

Online Questionnaire on the Impacts of training in conservation

Dear *FIRST/LAST NAME*,

I am a student at Imperial College London studying for my master's degree, and I am conducting a research project on the different impacts of career training. I would like to invite you to take part in this questionnaire, which will attempt to explore some of these impacts. I have been given your email from the partner institution(s) I am involved with, however in order to avoid response bias, the partner institution(s) which have provided me with your contact details must remain anonymous at this stage of the evaluation.

I must also at this stage withhold information on my degree subject, and the types of impacts I am specifically trying to evaluate, again to avoid response bias.

More information on the particulars of the research project will be provided further along the questionnaire.

During the piloting phase of this study, respondents took on average 9 minutes to complete the questionnaire.

All responses are completely anonymous, and will be kept with strict confidence, and deleted once the study is completed. If you would like to participate, then please click the link below, which will take you to the online qualtrics version of the questionnaire.

Thank you.

[Looping descriptions have been removed to reduce size of document – causes question numbers to mix – but all in correct order].

Q1 Hello, Please press the ">>" button to START the survey. Kind Regards, Lucas

Q3 Have you received training courses which have led to formal accreditation, separate to formal education?

No (1)
Yes (2)

Q4 Please state the names of the 3 most valued training courses you have received in the past. Note: Please do not list primary, secondary, bachelor, master or doctorate degree training. You may list training you have received which goes as far back as 40 years from this day, if this applies. Training: Enhanced knowledge,

skills and exchanging information for practitioners, stakeholders, and other relevant individuals in a structured setting outside of a degree program.

Training 1 (1)
Training 2 (2)
Training 3 (3)

Q5 Please state the names of the institutions which provided you these courses.

Institution 1 (1)
Institution 2 (2)
Institution 3 (3)

Q6 Please state the names of the 3 most valued training courses you have received in the past, which have lasted 5 days or longer. Note: Please do not list primary, secondary, bachelor, master or doctorate degree training. You may list training you have received which

goes as far back as 40 years from this day, if this applies. Training: Enhanced knowledge, skills and exchanging information for practitioners, stakeholders, and other relevant individuals in a structured setting outside of a degree program.

Training 1 (1)

Training 2 (2)

Training 3 (3)

Q7 Please state the names of the institutions which provided you these courses.

Institution 1 (1)

Institution 2 (2)

Institution 3 (3)

Q8 The following section will ask you for some details about yourself. This information is needed to understand the relationship between how different people and their particular circumstances produce different associated impacts. Please rest assured that all responses remain anonymous.

Q9 What is your gender?

Female (1)

Male (2)

Q10 How old are you?

18-25 (1)

26-34 (2)

35-54 (3)

55-64 (4)

65 or over (5) _____

Q12 In which country were you born?

[drop down menu provided]

Q19 What is your highest level of formal education?

Primary (1)

Secondary (2)

High School (3)

Bachelor Degree (4)

Master's Degree (5)

Doctorate Degree (6)

Not applicable - self taught (7)

Q15 Are you currently employed?

Yes - full time (1)

Yes - part time (2)

No (3)

Q16 Do you work in the environmental sector?

No (1)

Yes (2)

Q17 What is your organisation's primary sector?

Carbon, Climate and Energy (1)

Conservation and Wildlife (2)

Ecology (3)

Environmental Education (4)

Environmental Policy & Campaigning (5)

Food, Farming & Organics (6)

Marine Conservation (7)

Sustainability (8)

Research (9)

Other (10)

Q18 How would you categorise your organisation?

Academic Institution (Colleges, tertiary education institutions) (1)

Local Government (2)

Regional Government (3)

Local non-Government (4)

National Government (5)

Foundation (6)

Private (7)

International non-Government (8)

International Governmental (9)

Other (10)

Q20 Which organisation/company do you work for?

Q21 How would you categorise your current job position?

Voluntary (1)

Intern (2)

First-Level (3)

Mid-Level (4)

Senior-Level (5)

Board + Executives (6)

Q22 How many years have you been in this position?

Less than 1 (1)

1-3 (2)

4-6 (3)

7-9 (4)

10-12 (5)

13-15 (6)

16-18 (7)

19-21 (8)

22-24 (9)

25-27 (10)

28-29 (11)

More than 30 (12)

Q23 Thank you for filling in the previous section. Now that this is complete, I can tell you more about my research project. I am a student at Imperial College London studying Conservation Science, and as part of this degree, my research project is exploring the potential conservation impacts of training provided by the Durrell Conservation Academy. The Durrell Conservation Academy, as part of the Durrell Wildlife Conservation Trust, has been providing conservation training courses since 1977, and has since then been unable to quantify the impact which this training may have had throughout the world. You attended a course provided by the trust within your career, however you may have known the organisation as the Jersey Wildlife Preservation Trust during this time. The following section will ask you questions about your life at the time of attending the course. This information is needed to understand how people's particular circumstances may have changed since attending the course. Please click the ">>" button to proceed.

Q24 What year did you attend a course provided by the Durrell Conservation Academy? Please note: If you attended more than one course, then select the year of the course you attended which you found most valuable, and fill in the questionnaire based on this choice. [drop down menu provided from years 1977-2015]

Q139 How old were you when you attended the course?
18-25 (1)
26-34 (2)
35-54 (3)
55-64 (4)
65 or over (5) _____

Q26 Which course did you attend? [drop down menu with all courses provided]

Q61 How long was the course you attended?
1-2 days (1)
3-5 days (2)
1 week (3)
2 weeks (4)
3 weeks (5)

4 weeks (6)
2 months (7)
3 months (8)
6 months (9)
11 months (10)

Q37 Did you complete the whole course?
No (1)
Yes (2)

Q38 Did you submit all the work you needed to, both during, and after the course finished (if this applies).
No (1)
Yes (2)
Does not apply (3)

Q36 Please select the box the statement which best describes your English language ability before attending the course.
I could read, speak and write fluently. (1)
I had a broad range of English language to express myself clearly in writing and speech. (2)
Sufficient range to be able to give clear descriptions. (3)
Enough to get by to express myself with some hesitation. (4)
Had a basic repertoire to deal with everyday situations. (5)
Very basic range to convey personal details. (6)

Q28 Were you employed at the time of attending the course?
Yes - full time (1)
Yes - part time (2)
No (3)

Q29 Did you work in the environmental sector?
No (1)
Yes (2)

Q30 What was the organisation's primary primary sector? [drop down menu provided with options taken from environmentlajob.co.uk]

Q31 How would you categorise that organisation?
Academic Institution (Colleges, tertiary education institutions) (1)
Local Government (2)
Regional Government (3)

Local non-Government (4)
National Government (5)
Foundation (6)
Private (7)
International non-Government (8)
International Governmental (9)

Q34 Which organisation did you work for at the time of attending the course?

Q32 How would you categorise your job position back then?

Voluntary (1)
Intern (2)
First-Level (3)
Mid-Level (4)
Senior-Level (5)
Board + Executives (6)

Q33 How many years were you in that position?

Less than 1 (1)
1-3 (2)
4-6 (3)
7-9 (4)
10-12 (5)
13-15 (6)
16-18 (7)
19-21 (8)
22-24 (9)
25-27 (10)
28-29 (11)
More than 30 (12)

Q35 Did you return to that position, after finishing the course?

No (1)
Yes (2)

Q39 This section will now ask you questions related to any potential impacts the course may have had on factors related to your personal circumstances. Please click the “>>” button to proceed

Answer If Did you return to that position, after finishing the course? Yes Is Selected

Q40 When you returned to work, did your roles in the organisation change within 2 years of attending the course?

No (1)
Yes (2)

Q40 In what way did your roles change?
Demotion (1)

More responsibilities in the same position (2)
Promotion (3)
Fewer responsibilities in the same position (4)

Q41 I was demoted within two years of returning to work. Was this....

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q150 Did your salary...

Increase (1)
Decrease (2)
Stay the same (4)

Q42 I gained more responsibilities within two years of returning to work. Was this....

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q151 Did your salary...

Increase (1)
Decrease (2)
Stay the same (3)

Q43 I was promoted within two years of returning to work. Was this....

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q152 Did your salary...

Increase (1)
Decrease (2)
Stay the same (3)

Q44 I gained fewer responsibilities within two years of returning to work. Was this....

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q153 Did your salary...

Increase (1)

Decrease (2)

Stay the same (3)

Q45 Did you start working after the course?

No (1)

Yes (2)

Q143 Did you start further education after the course?

Yes (1)

No (2)

Q145 I started further education after the course. Was this....

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

Q146 Please provide a brief description of what you went on to study and where.

Q144 What did you do?

Q46 Did you start working for an established organisation?

No (1)

Yes (2)

Q47 I started working for an established organisation. Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

Q48 Did you start working for your own organisation?

No (1)

Yes (2)

Q147 What did you do?

Q49 I started working for my own organisation. Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

Q50 Did you create this organisation with anyone else?

No (1)

Yes (2)

Q51 Did they attend one of the courses provided by the Durrell Conservation Academy?

No (1)

Yes (2)

Don't know (3)

Q52 What is your organisation called?

Q53 Please provide a brief description, of what your organisation works on? (goals, objectives, vision, species, habitats, landscapes etc).

Q54 In which country is your organisation's head office located? [drop down menu offered with country list]

Q60 Please select the box the statement which best describes your English language ability after attending the course.

I could read, speak and write fluently. (1)

I had a broad range of English language to express myself clearly in writing and speech. (2)

Sufficient range to be able to give clear descriptions. (3)

Enough to get by to express myself with some hesitation. (4)

Had a basic repertoire to deal with everyday situations. (5)

Very basic range to convey personal details. (6)

Q63 This section will now ask you questions related to the potential impacts the course may have had on factors related to your organisation. Please click the ">>" button to proceed

Q157 Did you create/set-up any partnerships/initiatives with people you met on the course?

Yes (1)

No (2)

Not applicable - I was the only person on the course. (3)

Q158 What was the name of the person(s) you made the partnership/initiative with? Please note: this information is simple for cross checking information. It will be kept in confidence and I will not contact this person,

Q159 Did you know this person(s) before attending the course?

Yes (1)

No (2)

Q160 Please provide a brief description of what you created/set-up.

Q64 Are there other people within your organisation who have attended a course provided by the Durrell Conservation Academy?

No (1)

Yes (2)

Q65 How many people within your organisation have attended a course provided by the Durrell Conservation Academy?

1-3 (1)

4-6 (2)

7-9 (3)

More than 10 (4)

Don't know (5)

Q66 Were you able to implement/use things you learned on the course within your organisation?

No (1)

Yes (2)

Q70 Please select the following departments, where you were able to most implement/use information and skills related to improving any aspects of activities related to the following-
Accounting and Finance About funding, profit and funding mediums. **Human Resource Management** About staff turn-over, motivation, volunteers, in-house training and formal education. **Marketing** About social media and the use of marketing materials. **Management and Administration** About data management and information sharing systems, project management, transparency and organisational partnerships. **Logistics** About project planning, prioritising and coordination. **Public Engagement** About

community engagement and outreach, public education, and campaigning and lobbying. Research and Development
About scale of work conducted, interdisciplinary collaboration, publications, and access to specialist/ised equipment

Accounting and Finance (1)

Human Resource Management (2)

Marketing (3)

Management and Administration (4)

Logistics (5)

Public Engagement (6)

Research and Development (7)

Q69 Accounting and Finance: About funding, profit and funding mediums. Please disagree or agree with the following statements. I was involved with accounting and finance. Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

(2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

(4)

Q72 Please provide details of what you were involved with.

Q68 Human Resource Management:

About staff turn-over, motivation, volunteers, in-house training and formal education. I was involved with human recourse management.

Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

(2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

(4)

Q73 Please provide details of what you were involved with.

Q71 Marketing: About social media and the use of marketing materials. I was involved with marketing. Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

(2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

(4)

Q74 Please provide details of what you were involved with.

Q75 Management and Administration: About data management and information sharing systems, project management, transparency and organisational partnerships. I was involved with management and administration. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q76 Please provide details of what you were involved with.

Q77 Logistics : About project planning, prioritising and coordination. I was involved with logistics. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q78 Please provide details of what you were involved with.

Q79 Public Engagement : About community engagement and outreach, public education, and campaigning and lobbying. I was involved with public engagement. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q80 Please provide details of what you were involved with.

Q81 Research and Development: About scale of work conducted, interdisciplinary collaboration, publications, and access to specialist/ised equipment I was involved with research and development. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

Q82 Please provide details of what you were involved with.

Q141 Why were you unable to implement/use the things you learned on the course?

- I did not want to implement anything I learned. (1)
- The course did not provide me with sufficient knowledge to implement new things. (2)
- The course did not provide me with sufficient skill to implement new things. (3)
- My managers were unwilling to allow me to implement new things I learned on the course. (4)
- There was no funding available to implement some of the things I learned on the course. (5)
- Other colleagues in the organisation were already implementing things I learned on the course. (6)
- Negative attitudes were directed towards me from my colleagues. (7)
- There was no need for me to implement things I learned on the course, because my organisation was well functioning. (8)
- Other (9) _____

Q142 Why did you not want to implement anything?

Q83 Almost finished!!!This is the last section, and the most exciting one! Here the questions will ask you about any impacts the course may have had on biodiversity. Please press the ">>" button to proceed.

Q85 Have you been able to implement/use some of the things you learned on the course, to help wider systems and biodiversity?

- Yes (1)
- No (2)

Q84 Please select the following areas, where you were able to most implement/use information and skills related to identifying, establishing, managing, making, implementing, changing and providing the following- **Land and water protection About establishing/expanding parks or other protected areas, and to protect resource rights. Land/water management About: conserving or restoring sites, habitats and the wider environment. Species Management About managing or**

restoring species, focused on the species of concern itself (includes veterinary medicine). Education and awareness About working with people to improve understanding and skills, and influence behaviour. Law and Policy About influencing legislation/policies at all levels. Livelihood, economics and other incentives About using economic and other incentives to influence behaviour. External Capacity Building About building the infrastructure to do better conservation.

Land and water protection (1)

Land and water management (2)

Species Management (3)

Education and awareness (4)

Law and Policy (5)

Livelihood, economics and other incentives (6)

External capacity building (7)

Q86 Within land and water protection, which of these areas have you worked in, after you attended the course? [Select all that apply].
Site/Area protection: Establishing or expanding public or private parks, reserves, and other protected areas roughly equivalent to IUCN categories I-VI. (1)
Resource/Habitat protection: Establishing protection or easements of some specific aspect of the resource on public or private lands outside of IUCN categories I-VI. (2)

Q87 Site/Area protection: Establishing or expanding public or private parks, reserves, and other protected areas roughly equivalent to IUCN categories I-VI. I was involved with site/area protection. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q88 Please provide details of what you were involved with.

Q90 Resource/Habitat protection: Establishing protection or easements of some specific aspect of the resource on public or private lands outside of IUCN categories I-VI. I was involved with resource/habitat protection. Was this...
As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q91 Please provide details of what you were involved with.

Answer If Please select the following areas, where you were able to most implement/use information and skills related to identifying, establishing, managing, making, implementing, changing and providing the ...
Land and water management Is Selected

Q89 Within land and water management, which of these areas have you worked in, after you attended the course? [Select all that apply].
Site/Area management: Management of protected areas and other resource lands for conservation. (1)
Invasive species control: Eradicating, controlling and/or preventing invasive and/or other problematic plants, animals, and pathogens. (2)
Habitat and natural process restoration: Enhancing degraded or restoring missing habitats and ecosystem functions; dealing with pollution. (3)

Q92 Site/Area management: Management of protected areas and other resource lands for conservation. I was involved with site/area management. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q96 Please provide details of what you were involved with.

Q93 Invasive species control: Eradicating, controlling and/or preventing invasive and/or other problematic plants, animals, and pathogens. I was involved with invasive species control. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course.
(4)

Q97 Please provide details of what you were involved with.

Q94 Habitat and natural process restoration: Enhancing degraded or restoring missing habitats and ecosystem functions; dealing with pollution. I was involved with habitat and natural process restoration. Was this...

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q95 Please provide details of what you were involved with.

Q98 Within species management, which of these areas have you worked in, after you attended the course? [Select all that apply].

Species Management: managing specific plant and animal populations of concern. (1)

Species recovery: manipulation, enhancement or restoration of specific plant and animal populations. (2)

Species reintroduction: reintroduction of species to different places where they formally occurred or nonthreatening introductions. (3)

Ex-situ conservation: protecting biodiversity out of its native habitats. (4)

Veterinary medicine: building veterinary facilities, managing, operating, and curing injured or diseased captive or wild species, or implementing veterinary protocols. (5)

Q99 Species Management: Managing specific plant and animal populations of concern. I was involved with species management. Was this...

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q104 Please provide details of what you were involved with.

Q100 Species recovery: Manipulation, enhancement or restoration of specific plant

and animal populations. I was involved with species recovery. Was this...

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q105 Please provide details of what you were involved with.

Q101 Species reintroduction: Reintroduction of species to different places where they formally occurred or nonthreatening introductions. I was involved with species reintroduction. Was this...

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q106 Please provide details of what you were involved with.

Q102 Ex-situ conservation: Protecting biodiversity out of its native habitats. I was involved with ex-situ conservation. Was this...

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q107 Please provide details of what you were involved with.

Q103 Veterinary medicine: Building veterinary facilities, managing, operating, and curing injured or diseased captive or wild species, or implementing veterinary protocols. I was involved with veterinary

medicine. Was this...

As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)

Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q108 Please provide details of what you were involved with.

Q109 Within education and awareness, have you worked in any of the following areas, after you attended the course? [Select all that apply].

Formal education: Enhancing knowledge and skills of students in a formal degree program.

(1)

Training: Enhanced knowledge, skills and exchanging information for practitioners, stakeholders, and other relevant individuals in a structured setting outside of a degree program. (2)

Awareness and Communications: Raised environmental awareness and providing information through various media or through civil disobedience. (3)

Q110 Formal education: Enhancing knowledge and skills of students in a formal degree program. I was involved with formal education. Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

(2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

(4)

Q113 Please provide details of what you were involved with.

Q111 Training: Enhanced knowledge, skills and exchanging information for practitioners, stakeholders, and other relevant individuals in a structured setting outside of a degree program. I was involved with training. Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

(2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

(4)

Q114 Please provide details of what you were involved with.

Q112 Awareness and Communications:

Raised environmental awareness and providing information through various media or through civil disobedience. I was involved

with awareness and communications.

Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

(2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

(4)

Q115 Please provide details of what you were involved with.

Q116 Within law and policy, which of these areas have you worked in, after you attended the course? [Select all that apply].

Legislation (Native People's legislation, local, regional, national, international, global):

Implemented, changed, influenced, or provided input into formal government sector legislation, or policies for some or all levels of levels (1)

Policies and regulations: Made, implemented, changed, influenced, or provided input into formal government sector legislation, or policies for some or all levels of these levels. (2)

(2)

Private sector standards: Set, implemented, changed, influenced, provided input into voluntary standards and professional codes that govern private sector practice (3)

Compliance/Enforcement: Monitored and enforced compliance to laws, policies and regulations, and standards and codes at some or all levels (4)

Q119 Legislation (Native People's legislation, local, regional, national, international, global): Implemented, changed, influenced, or provided input into formal government sector legislation, or policies for some or all levels of levels I was involved with legislation. Was this...

As a direct result of attending the course. (1)

Somewhat influenced by attending the course. (2)

(2)

Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

(4)

Q123 Please provide details of what you were involved with.

Q120 Policies and regulations: Made, implemented, changed, influenced, or provided input into formal government sector

legislation, or policies for some or all levels of these levels. I was involved with policies and regulation. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q124 Please provide details of what you were involved with.

Q121 Private sector standards: Set, implemented, changed, influenced, provided input into voluntary standards and professional codes that govern private sector practice. I was involved with policies and regulation. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q125 Please provide details of what you were involved with.

Q122 Compliance/Enforcement: Monitored and enforced compliance to laws, policies and regulations, and standards and codes at some or all levels I was involved with compliance and enforcement. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q126 Please provide details of what you were involved with.

Q117 Within livelihood, economics and other incentives, which of these areas have you worked in, after you attended the course? [Select all that apply].

Linked enterprises and livelihood alternatives: Developed enterprises that directly depend on the maintenance of natural resources or provide substitute livelihoods as a means of changing behaviours and attitudes. (1)

Substitution: Promoted alternative products and services that substitute for environmentally damaging ones. (2)

Market forces: Used market mechanisms to change behaviours and attitudes. (3)

Conservation payments: Used direct or indirect payments to change behaviours and attitudes. (4)

Non-monetary values: Used intangible values to change behaviours and attitudes. (5)

Q127 Linked enterprises and livelihood alternatives: Developed enterprises that directly depend on the maintenance of natural resources or provide substitute livelihoods as a means of changing behaviours and attitudes I was involved with linked enterprises and livelihood alternatives. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q132 Please provide details of what you were involved with.

Q128 Substitution: Promoted alternative products and services that substitute for environmentally damaging ones. I was involved with substitution. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q133 Please provide details of what you were involved with.

Q129 Market forces: Used market mechanisms to change behaviours and attitudes. I was involved with market forces. Was this...

- As a direct result of attending the course. (1)
- Somewhat influenced by attending the course. (2)
- Unrelated to your attendance on the course. (3)
- Hampered by your attendance on the course. (4)

Q134 Please provide details of what you were involved with.

Q130 Conservation payments: Used direct or indirect payments to change behaviours and attitudes. I was involved with conservation payments. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q135 Please provide details of what you were involved with.

Q131 Non-monetary values: Used intangible values to change behaviours and attitudes. I was involved with non-monetary values. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q136 Please provide details of what you were involved with.

Q118 Within external capacity building, which of these areas have you worked in, after you attended the course? [Select all that apply].
Institutional and Civil Society development: Created or provided non-financial support and capacity building for non-profits, government agencies, communities, and/or for-profit organisations. (1)
Alliance and Partnership development: Formed or facilitated partnerships, alliances, and networks of organisations. (2)
Conservation finance: Raised and/or provided funds for conservation work. (3)

Q137 Institutional and Civil Society development: Created or provided non-financial support and capacity building for non-profits, government agencies, communities, and/or for-profit organisations. I was involved with institutional and civil society development. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)

Hampered by your attendance on the course. (4)

Q140 Please provide details of what you were involved with.

Q138 Alliance and Partnership development: Formed or facilitated partnerships, alliances, and networks of organisations. I was involved with alliance and partnership development. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q141 Please provide details of what you were involved with.

Q139 Conservation finance: Raised and/or provided funds for conservation work. I was involved with conservation finance. Was this...
As a direct result of attending the course. (1)
Somewhat influenced by attending the course. (2)
Unrelated to your attendance on the course. (3)
Hampered by your attendance on the course. (4)

Q142 Please provide details of what you were involved with.

Q143 Is there anything else you would like to say?

Q144 END OF QUESTIONNAIRE Thank you for completing the questionnaire!!! If you have any questions about this study, then please do not hesitate to contact me. If you would like to receive a report with the results and summary implications, once I complete and submit the dissertation at the start of September, then please write your name and email address in the space below. Thanks Again! Lucas Ruzowitzky

Name (1)

Email (2)

Appendix 2 – chi-squared co-efficient tables

Chi-squared co-efficient tables of univariates selected for testing training impact on Species Management and Education & Awareness.

Table 18 Chi-squared coefficients for explanatory variables on impact of training in Species Management

	X²-squared	df	p
Country born region	2.41	3	0.491
Decade course attended	3.88	2	0.143
Category course attended	1.02	2	0.5991
Highest Education	1.31	2	0.5171
Organisational Sector	7.099E-31	1	1
Years in Job	0.83	2	0.65
Age during course	0.58	2	0.74
Duration of course attended	0.21	1	0.64
Employment status	2.14	1	0.14
Job Position	1.44	2	0.48

Table 19 Chi-squared coefficients for explanatory variables on impact of training in Education & Awareness

	Fisher used	X²-squared	df	p
Country born region	Yes			0.04
Decade course attended		2.67	2	0.26
Category course attended	Yes			0.05
Highest Education	Yes			0.113
Organisational Sector	Yes			0.73
Years in Job		4.8	2	0.09
Age during course	Yes			0.11
Duration of course attended	Yes			0.0003
Employment status		0.88	1	0.34
Job Position	Yes			0.89

Appendix 3 – Key Informants and DESMAN participants

Key informant and trainee participants interviewed during scoping study

Table 20 Key informants, roles at Durrell and nationalities.

Key Informant	Roles at Durrell	Nationality
Jamie Copsey	Head of Training	English
Tim Wright	Deputy Head of Training	English
Catherine Burrows	Training Co-ordinator	English
Eluned Price	Wildlife Park Research Co-ordinator	English
Henry Duffy	DESMAN course co-ordinator	English
Chris Clarke	Former Head of Training – now in trust and grant fundraising.	English

Table 21 Trainee participants, professions and nationalities.

DESMAN Trainee	Profession	Nationality
Bukola Adotela	Professor of Eco-tourism and Wildlife, University of Nigeria	Nigerian
Christianne Willard	Animal Transport Co-ordinator, ARTIS Royal Zoo, Amsterdam	Dutch
Diogo Lagrotaria	Veterinarian, IBAMA, Manaus	Brazilian
Emmanuel Bassey	Project Manager, Afi Mountain Wildlife Sanctuary, WCS	Nigerian
Erika Servin	Research Co-ordinator, Mexico City Zoo	Mexican
Kumal Rai	Freelance researcher for community development	Nepali
Machel Sulton	Technician for Mountain Chicken Project, Dominican Forestry and Wildlife Parks Division	Montserratian
Patricia Mendoza	Technician for Amphibian Bolivian Initiative	Bolivian
Payal Nairn	Public Engagement officer, WWF, India	Indian
Roberto Haddad	Project Co-ordinator, IPE, São Paulo	Brazilian
Anieta Shan-yo (Sweety)	Habitat Restoration Technician, Mauritian Wildlife Foundation	Rodriguan
Thirumurugan Zoovet (Thiru)	Veterinarian, Tamlar Forestry Department	Indian

Appendix 4 – Academy Training Courses

Table 22 Full list of courses offered at the academy in its whole history, along with the assigned course categories

Number	Course Name	Assigned category
1	Amphibian Biodiversity Conservation	Conservation
2	Amphibian Conservation Husbandry	Husbandry
3	Art Illustration Course	Hobbyist
4	Avian Egg Incubation	Conservation
5	Beauty of Birds	Hobbyist
6	Bird Husbandry	Husbandry
7	Breeding and Conservation of Endangered Species (courses pre-1985)	Husbandry
8	Callitrichid and Lemur Husbandry	Husbandry
9	Central Zoo Authority Training Course	Other
10	Conservation Education and Evaluation	Education
11	Conservation Breeding and Husbandry of Birds	Husbandry
12	Conservation Breeding and Husbandry of Callitrichids	Husbandry
13	Conservation Education & Interpretation	Education
14	Conservation Education and Evaluation	Education
15	Durrell Endangered Species Management (DESMAN)	Conservation
16	Durrell Post-Graduate Diploma in Endangered Species Recovery	Conservation
17	Endangered Species Recovery	Conservation
18	Facilitation	Management
19	Facilitation Skills aka PHVA	Management
20	Facilitation and Skills	Management
21	Facilitation and Communication Skills	Management
22	Integrated Species Conservation Management	Conservation
23	Integrated Species Management	Conservation
24	Island Species-led Action	Conservation
25	Invasive Species Management	Conservation
26	Latest Developments in Primate Conservation	Conservation
27	Leadership Skills	Management
28	Leadership and Project Management	Management
29	Managing Infectious Diseases	Husbandry
30	Managing and Leading Conservation Projects	Management
31	MESRT	Other
32	Project Management	Management
33	Passion for Primates	Hobbyist
34	Réseau des Educateurs et Professionnels de la Conservation à Madagascar	Other
35	Wildlife Disease Management in Species Conservation	Husbandry
36	Zoo Education	Education
37	Other	Other