SLU | Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

**Faculty of Natural Resources and
Agricultural Sciences**

Ecosystem restoration and community involvement in the Whangamarino Wetlands of New Zealand

Nicholas Magnolfi

Ecosystem restoration and community involvement in the Whangamarino Wetlands of New Zealand

Nicholas Magnolfi

Abstract

Ecosystem restoration is the process of assisting the recovery of an ecosystem. The community's role in restoration projects is key. Good restoration includes social and cultural goals determined by stakeholders' perspectives, making it process-oriented. The idea of using this process both in academia and practice is growing worldwide, and numerous restoration projects have been implemented. However, a gap between research and practice has emerged. There is a lack of a across-site theory that can be relevant to different sites. Using data acquired through the application of the process-oriented framework to the Whangamarino Wetland Restoration Project of New Zealand, the research aims to contribute to the research/practice discussion. It builds a process-oriented theoretical framework collected through literature reviews. It relies on two core concepts, decision-making and cultural significance. Data was collected through qualitative interviews with DoC staff in Whangamarino. The results show that community involvement relies on agency. The objective of the project is to inform larger scale wetland restoration through learning. The Restoration Project is process-oriented to a certain degree.

Acknowledgements

Firstly, I would like to thank the kind and available DoC staff of the Hamilton, Waikato branch. Their openness, flexibility and passion in what they do made this thesis possible in the first place.

I would like to thank my supervisor. I would also like to say thank you to all those involved in my MA program over the last two years.

Lastly, I would like to thank my family and friends, without whom none of it would ever be worth it.

Table of contents

List of Figures and Tables

Abbreviations

AKWRP   Arawai Kakariki Wetland Restoration Programme

BR   Biodiversity ranger

CBD   Convention for Biological Diversity

CI   Community involvement

CR   Community ranger

FCS   Flood Control Scheme

FR   Field ranger

NRM   Natural resource management

NZ   New Zealand

RQ   Research question

SQ   Sub-question

WWRP   Whangamarino Wetland Restoration Programme

1. Introduction

Ecosystem restoration is defined as: "the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed" (SER Primer, 2004). The idea of using this process both in academia and practice is growing worldwide, and numerous restoration projects have been implemented. The United Nations General Assembly has declared the 2021-2030 decade as the UN Decade on Ecosystem Restoration, offering unparalleled opportunity for restoration projects (United Nations 2019). At the Convention for Biological Diversity (CBD), in 2010, the target to restore at least 15% of degraded ecosystems was set. Important components of ecosystem restoration include climate mitigation, biodiversity, ecosystem services and goods and natural capital (CBD 2018; European Commission 2019; United Nations 2019). These components are essential to human life. Still, human activities are reducing the capacity of an ecosystem to provide these components (Daily *et al.* 1997).

Another important, yet less discussed, component of ecosystem restoration mentioned in the CBD's sub-targets is community involvement (CI). It aims at enhancing implementation by respecting indigenous and community practice and knowledge in conservation and sustainable biodiversity use (CBD, 2010). With CI, restoration becomes mutually beneficial for nature and society (Clewell & Aronson 2006). The necessity to strengthen CI is called for by policy makers such as in the European Commission's *Action Plan for nature, people and the economy* (2017).

The community's role in restoration projects is key. For example, an innovative coastal restoration project in Perth was once vetoed by local communities (Lowe 2016). This reflects the importance of CI for ecosystem restoration and is representative of a more general trend in natural resource management. Following the 1992 Earth Summit, there were strong advocations for the change of natural resource management, which are: government decentralization, devolution of natural resource management to local communities and CI (Leach *et al.*, 1999). In natural resource management CI is: a commitment to involving local institutions and communities in management and conservation of natural resources, devolvement of power and decision-making from central government to local and indigenous communities and a desire to link socioeconomic development to environmental protection (Kellert *et al.* 2000). A type of natural resource management is ecosystem restoration. Higgs, a leading scholar in the field (Higgs 1994, 2017; Higgs *et al.* 2018a; b), takes a stance in the advocation. He starts by pointing out the traditional view of ecosystem restoration, based upon three principles of ecological fidelity: structural replication, functional success and durability. This view of restoration is a technical one, based upon evaluation of performance criteria. It considers ecological functions of direct interest to people without considering direct human involvement with an ecosystem. Higgs calls this product-oriented restoration. Subsequently, he argues that broadening the scope of restoration to community-based ideals makes the step from ordinary to good restoration. Community-based idealism brings about consideration in terms of historical, social, political, cultural, aesthetic and moral contexts. It adds reason and motivation to the call for direct CI in an ecosystem. In other words, restoration is community-based as much as it is technocratic (Higgs 1997). Good restoration includes CI, social and cultural goals determined by stakeholders' perspectives, making it as process-oriented as it is product-oriented. In this sense, Higgs uses the concept of process-oriented restoration to refer to restoration that includes communities but still uses ecological fidelity.

It is through stakeholders' perspectives that restorationists can identify priorities in the technocratic aspects of restoration. Hence, a combination of process-oriented approach and ecological fidelity can be used to build a framework for site-specific restoration.

Process-oriented restoration is thus a holistic process (Clewell & Aronson 2006). A key feature of process-oriented restoration is the devolvement of decision-making to stakeholders, particularly local citizenry. Governmental organisations and public officials must be willing to relinquish hierarchy and create partnership with stakeholders, rendering decision-making inclusive. By doing so, conditions for interdisciplinary communication and knowledge transfer are created. In return, stakeholders must inject the project with cultural significance (Aronson *et al.* 2006). This means that: "Ecosystems are not treated as commodities in need of repair but inseparable aspects of culture." (Clewell & Aronson 2006 p. 423). Cultural significance comes from two concepts by Clewell & Aronson (2006): reentry into nature and the renewal of the culture and nature nexus. The former is community engagement in nature through hands-on and unselfconscious interaction. The latter is related to the loss of indigenous cultural identity and its recreation by restoring a cultural landscape through the restoration of culture itself. Therefore, through injection of cultural significance into restoration, stakeholders increase attachment to land by different communities.

In New Zealand – a country made up of over 600 islands - ecosystem restoration has been implemented with success on some smaller islands, such as the Mangere, Cuvier and Tiritiri Matangi Island (Department of Conservation, 1996). On the mainland islands, however, endemic flora and fauna are still threatened, and projects have been implemented to reduce the threat, primarily through pest control (Saunders & Norton 2001). One of the most threatened ecosystems in New Zealand (NZ) are wetlands, despite their importance for the country as argued by the Minister of Conservation Eugenie Sage: "Wetlands are an integral part of a healthy landscapes and ecosystems, functioning as nature's 'kidneys' to filter and protect water quality […] They provide home for rare and threatened wildlife and plants." (Office of the Minister of Conservation, 2018). Inland wetlands approximately covered 9% of the land mass – 2 500 000 hectares – prior to European colonization. Today, wetlands cover only 10% of that land – 250 000 hectares – due to the clearing of wetlands for other uses (Towns & Ballantine 1993; Robertson *et al.* 2018). 97% of wetland loss has occurred predominately on private land, away from areas allocated for conservation.

The persisting degradation and reduction of wetland ecosystems in NZ occurs on private land due to anthropogenic pressure. Agriculture and landscape modification have a dangerous effect on biodiversity. The implementation of economically oriented projects results in further degradation of the wetlands. This is the case for Whangamarino Wetland - located on the North Island of NZ in the Waikato region. The damage of economic projects has resulted in the degradation of Lake Waikare, as can be seen in *Figure 1*. The wetland is the second largest bog and swamp complex in the North Island, amounting to 6,912 hectares, 5,690 of which were recognized by the Ramsar Convention as wetland of international importance. As of July 2007, the Department of Conservation (DoC) implemented the Arawai Kakariki (Green Waterway) Wetland Restoration Programme (AKWRP), an umbrella restoration project that includes Whangamarino Wetlands (WWRP). It is a "flagship programme […] aimed at protecting, restoring and understanding these ecosystems with the assistance of community." (Duggan *et al.* 2013 p. 7). The project has 10 objectives, subdivided into 3 categories: biodiversity, community and learning. In line with the CBD's components of restoration and calls from academia, CI is a key aim in the project. It focuses on the following community-oriented aspects: historic and cultural sites, sustainable land use, recreation and visitor facilities and CI and awareness (Duggan *et al.* 2013). Similarly to process-oriented restoration, there is an emphasis on cultural significance. Research shows that DoC values and prioritizes cultural and historical input

(Department of Conservation 2007; Duggan *et al.* 2013). This is due to the indigenous *tangata whenua* (Māori) communities found in the area. However, active cultural CI is not common. Participation in decision-making is present but not strong, and involvement in various aspects of the project is still low.

Figure 1: a dead fish in the polluted Lake Waikare of the Whangamarino Wetlands (Nicholas Magnolfi 2019)

1.1 Problem Formulation and Research Aim

Despite the importance given to CI in both practice and academia, practical implementation of process-oriented CI is still at its early stages (Suding 2011). The gap between theory and implementation is symbolic of the challenges facing process-oriented restoration thus far (Dickens & Suding 2013). Publications in community-based restoration increase at a steady rate, outweighing the increase in successful practical application. Articles suggest that CI is a necessity, but the process-oriented approach is seldom mentioned (Burbidge *et al.* 2011; Suding 2011; Dickens & Suding 2013; David *et al.* 2016). The focus of these articles remains on the technocratic – or product-oriented – restoration approach. Academics call for a broad theory based both on ecological fidelity and social criteria applicable across different projects, whereas practitioners emphasize the importance of site-specific practicality (Dickens & Suding 2013). The Whangamarino case is similar: the ideals of process-oriented CI are present but not fully practiced (Duggan *et al.* 2013).

This paper will explore the case-specifics of Whangamarino in relation to the broader process-oriented theory. By using a combination of literature on CI and process-oriented approach to analyse the case, I aim to contribute to the development of the approach. This will be done by creating an analytical framework that combines the ideals and concepts of CI in natural resource management and process-oriented approaches. By developing this framework and applying it to the Whangamarino project the thesis intends to contribute to bridging the gap between science and practice. The following research question (RQ) and sub-questions (SQ) will help frame the paper:

RQ): What are the results of applying process-oriented restoration framework to CI in the WWRP? How can it contribute to the science/practice gap?

SQ) 1: **What is the typology of CI in the WWRP?**

SQ) 2: **Does the Whangamarino project fulfill all necessary features to be defined as process-oriented restoration?**

SQ) 3: **What can be learned from the case that contributes to the science/practice debate?**

SQ 1 will be answered in the sections 4.1 and 4.2. SQ 2 will be answered in section 5.1. SQ 3 will be answered in 5.2. The conclusion will offer an answer to the main question, RQ. The questions will not be referred to directly, but the sections will offer an explicit answer.

2. Theoretical discussion

To answer the above research questions I will first expand upon the research-practice gap. Secondly, I will establish the base of the theoretical framework. I will do so by looking at previous research about CI in natural resource management (NRM). Thirdly, I will define two fundamental concepts of process-oriented restoration in further detail to use it in combination with the components found in NRM. Ultimately, this section will look at components from NRM and process-oriented restoration to define a framework that can be used to analyze the WWRP.

2.1 The research-practice gap

Here, the research-practice gap will be elaborated. Research (and/or researchers) is understood as theory and rigorous data used to develop an understanding of an ecosystem and the issues connected to it. It stems from the application of scientific methods and results in journals or articles on restoration (Jordan *et al.* 1990; Cabin *et al.* 2010; David *et al.* 2016). Practice (and/or practitioners) is understood as the hands-on restoration of an ecosystem. It is undertaken by managers of ecosystems and thus has social and economic resources to impact an ecosystem directly (Jordan *et al.* 1990; Cabin *et al.* 2010; David *et al.* 2016).

The communication and implementation of research in the field of conservation ecology – of which restoration is a subfield – has received considerable attention and sparked discussion in practice and academia alike (Burbidge *et al.* 2011). The science-practice divide is seen as one of the main issues in the field of restoration with few individuals and institutions working toward bridging the gap. Scholars agree that research should be incorporated into practice and that restoration is currently insufficient and does not reach the necessary ecological and social objectives. This results in limitations to both research and practice (Hobbs 2007; Cabin *et al.* 2010; Dickens & Suding 2013). Currently, the growing restoration research is focused on conceptual frameworks. However, there is no research that has brought the conceptual frameworks to practice and research is several steps removed from informing restoration practice (Dickens & Suding 2013). Furthermore, practitioners question the necessity of research in restoration. They often mention that researchers do not understand the economic limitations and stakeholder impact upon restoration. Thus, many practitioners are of the opinion that the research is inapplicable due to limited considerations of social, political and logistical factors (Dickens & Suding 2013).

A common rhetoric is that researchers have little experience and understanding of the actual practice of restoration (Dickens & Suding 2013; Cabin *et al.* 2010). According to a survey of stream restoration practitioners, less than 1% of over 300 restoration projects were informed by scientific research and journal papers. An on-line survey at the 2009 Society for Ecological Restoration International using multiple choice and three open-ended questions was conducted by (Cabin *et al.* 2010). Cabin et al.'s (2010) interviews showed that researchers bore the brunt of the criticism from the diverse respondents and were accused of being guilty of ignoring practitioners' needs, irrelevant research or failing to communicate with practitioners. Many of the researchers, however, were aware of this problem and seemed committed to resolving it. The two perspectives of researchers and practitioners on what ought to be done to develop restoration practices are categorized by Dickens and Suding (2013) as a call for broad across-site theory on behalf of researchers and a call for site-specific practicality on behalf of the practitioners. There is a

14

strong dichotomy between the two perspectives which hinder the development of a third perspective: an interrelation between practice and research, wherein ecosystem restoration research informs practice and functional practice informs research.

Cabin *et al.* (2010) conclusively states: "it is not surprising that bridging the science/practitioner gap has proven to be particularly difficult in disciplines that involve both the environment and a diverse assemblage of human stakeholders" (p. 787). Dickens and Suding (2013) recognize the difficulties with combining science and practice. Accordingly, they, and Cabin et al. (2010), suggest an approach to restoration which requires a substantial change in the roles of science and other stakeholders to equalize the power between the parties. It can increase the quantity of perspectives and ameliorate the interrelation between the dichotomous science/practice perspectives. This can be offered by a process-oriented approach.

2.2 CI in NRM

Comparatively, there is more literature on CI in NRM than there is on process-oriented restoration. Furthermore, often process-oriented restoration is considered as a type of CI in NRM. The following section will investigate best practice features in CI. Once best practice CI features – and their components – have been identified, they will be expanded. To build a framework applicable to CI in Whangamarino, the following features will be focused on: methods tailored to decision-making, philosophy-based, clear objectives for participatory process and integration of local and scientific knowledge. The features were selected as they were applicable to the WWRP.

Table 1 offers a visualization of the features and components. The components will be explored to build up to the features.
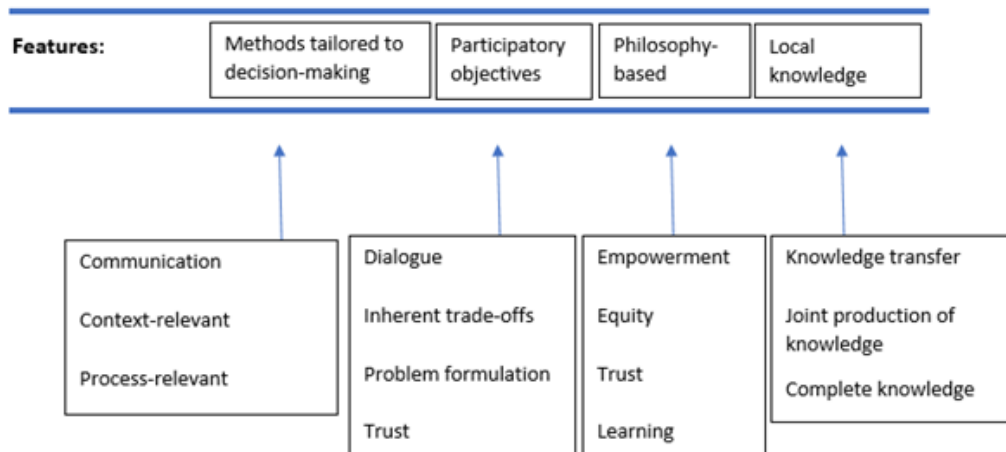
Table 1: the first step of the process-oriented framework. Adapted from Reed (2008)

2.2.1 Methods tailored to decision-making

According to Reed (2008), methods of decision-making can be chosen once the objectives of the process have been articulated, a level of engagement has been identified and relevant stakeholders have been selected for inclusion. Scholars agree that different methods of participation are appropriate to different levels of engagement (Reed 2008). The first component of this feature is communication. Communication between stakeholders and

practitioners should reflect and be designed according to the decision-making process (Reed 2008). At an early stage of the project, informing the community is necessary. Skilled practitioners must use different mediums and include information to different sources. Practitioners must also be skilled in integrating complex technical information with meanings and concepts that emerge from participatory decision-making (Tippett *et al.* 2007). Furthermore, communicative means should depend upon the context (Reed 2008). For example, using a website to disseminate information would not work in an area where there is no internet access. The second component is context relevance. The decision-making process and methods should reflect the cultural context. For example, using leaflets to inform the community on public consultation would not work in an area with a high illiteracy rate (Reed 2008). Practitioners must be aware of this (Reed 2008). An inclusive decision-making process that includes representatives from all ethnic and minority groups might not work, dependent upon the treatment of minority groups in the area. In this case, methods could also be tailored to answer to any contextual power dynamics, in order to equalize power between participants and ensure that the marginalized are heard (if appropriate to situation and the project design). The last component is process relevance. Methods should be tailored to the stage of the process (Reed 2008). For example, information dissemination should occur at an early stage, whereas outcome monitoring should occur at a later stage. Being prepared to use a range of tools can allow a practitioner or facilitator to adapt to changing circumstances that can be determined by socio-cultural, environmental or relevance to stage factor (Reed 2008).

2.2.2 Clear objectives for participatory process

According to Reed (2008), it is essential to articulate objectives for the participatory process in the project design. This presents a process-oriented approach based upon the objective. The first component is dialogue. Reflective and deliberative dialogue ensures the capacity to make trade-offs. The purpose of the dialogue is established deliberately. Goals developed through dialogue between participants have the following advantages: creating a sense of ownership of the process, partnership building and relevance of outcomes to stakeholder needs. This, in turn, increases active participation (Reed 2008). Furthermore, through this approach, participants can formulate the problem and effectively find the solution (Dunn 1988; Steinman *et al.* 2002). The second component is trade-offs. This consists of understanding that trade-offs are part of and should be an objective of the participatory process. It is a more deliberative approach that focuses on argumentation and explores assumptions and opinions of the participants through dialogue. The last component is problem formulation. Establishing dialogue reflectively increases problem formulation (Reed 2008). This, in turn, increases participants' capacity to solve problems, due to the intrinsic nature of problem formulation and solution (Reed 2008). The three components are closely linked, and all come as a result of well-formulated and well-moderated dialogue (Reed 2008).

2.2.3 Philosophy-based

A best practice CI project needs a strong philosophical underpinning. It is necessary to guide the development as the process unfolds and offer a path within a wide choice of tools and project design available (Reed 2008). According to Reed (2008), the components of the philosophy extracted from literature are empowerment, equity, trust and learning. The first component is empowerment. Empowerment, as defined by Conger and Kanungo (1988), is a motivational construct. It enables agency by creating conditions that motivate a sense of personal efficacy. The empowering process consists of identifying conditions that foster a sense of powerlessness and removing them (Conger and Kanungo 1988). In participation,

from a practitioner's perspective, this translates to ensuring that participants can influence decisions and that they have the technical capacity to engage with the decision (Reed 2008). According to Reed (2008), without a community's capacity to influence decisions, participation cannot be appropriate. The opportunity to participate in decisions is not enough, however. Stakeholders must be capable of participating. This leads to the second component, equity (Reed 2008). Kellert et al. (2000) see equity as: "the distribution and allocation of socioeconomic benefits and resources" (p. 707). This is: developing knowledge and confidence whilst providing education to guide stakeholders in technical decisions. The third component is trust. (Walker *et al.* 2010) define trust as a necessary characteristic and potential outcome of cooperative behaviour. Trust is thus fundamental to civic engagement: it can build mutual respect and foster collaboration (Putnam *et al.* 1994; Misztal 2013). Working with small groups and building opportunities to socialize is an effective technique to enhance trust, thus explicitly dealing with power issues and ensuring all stakeholders have a voice and reducing power inequalities (Prell *et al.* 2007). The last component is learning. According to (Schusler *et al.* 2003), learning is cited as a fundamental process in addressing the complexity and uncertainty in natural resource management. When learning is deliberative, participants put their own values and those of others, among other things, in perspective. Learning is also cited to transform relationships and facilitate co-management as a result (Schusler *et al*. 2003). Reed's interpretation of learning applied to practitioners is iterative and two-way. Knowledge transfers should be to, and from, participants with different knowledge and perspectives. This learning approach is important in long-term participatory processes where participants can monitor the outcomes of their decisions and change accordingly (Reed 2008).

2.2.4 Integration of local and scientific knowledge

According to Reed's analysis of literature (2008), the need for scientific information to inform stakeholder deliberation is an essential aspect of CI. This has given rise to participatory approaches and increased the integration of local and scientific knowledge. In the context of the components applied to the framework, local and scientific knowledge integration is framed as between managers/practitioners' knowledge and the community/stakeholders' knowledge. Scientific knowledge is understood to be explicit, systemized, decontextualized and transferrable, questioning the *why* behind observable phenomena and local knowledge is implicit, informal, context dependent and resulting from the *how* of experience, observation and practice (Reed 2008). Here, local knowledge will be interpreted as both skilled and cultural knowledge. This is to understand the rich cultural history on the area. Knowledge integration offers a more comprehensive understanding of complex social and natural systems and processes. Through integration of these knowledges, it is argued that communities and researchers can interact and produce more relevant research and practice (Reed 2008). However, it cannot be used unquestionably, thus researchers deem that an integrative approach between the two knowledges could empower local communities to manage environmental change successfully (Reed 2008). The first component is knowledge transfer. According to (Phillipson & Liddon 2007), knowledge transfer is the processes by which knowledge, skill and expertise is exchanged between producers and users. Reed claims that knowledge producers are typically researchers and knowledge users are typically stakeholders. Previously, knowledge transfer tended to be one-way, from researchers to users. Now, however, there has been a shift in paradigm to collaboration, where producers and users influence each other throughout knowledge production (Reed 2008). The second component is joint production of knowledge. This is where producers and users influence each other throughout the research process and where different forms of expertise acquire the same value in the production of knowledge. There is an emphasis on how mutually enriching two different types of knowledge can be (Phillipson and Liddon 2007). Knowledge transfer and the joint

production of knowledge create complete knowledge (Reed 2008). The last component is complete knowledge. It is knowledge that considers all perspectives from the local community. It establishes common ground between participants, as a result anticipating and ameliorating any negative issues before and as they occur (Reed 2008). According to Reed, decisions based on complete knowledge are likely to be more robust.

2.2.5 Link to process-oriented approach

As aforementioned, process-oriented restoration can be considered as a type of CI in NRM. Hence, the features and their relative components focused on are applicable to the process-oriented framework. Reed's (2008) literature review details the best-practice CI components relevant to the WWRP that will be used as the base of the framework. However, there are concepts that gain higher importance in process-orientation. They will be considered in the framework. They are: *decision-making* and *cultural significance*.

In the following section, I will first provide a general overview of process-oriented approaches. From this overview I will initially extract two key concepts of the process-oriented approach, *decision-making* and *cultural significance*. Following this I will describe why and how I will use them in the analysis of the case study. Ultimately, they will be used as overarching concepts in the theoretical framework for the WWRP.

2.3 General overview of process-oriented approaches

As seen above, CI in natural resource management and ecosystem restoration is highly discussed. The process-oriented approach is less prevalent, and the focus remains on product-oriented restoration. There are some key scholars who discuss process-oriented restoration (McPherson & Johnson 1988; Higgs 1997; Leach *et al.* 1999; Randolph & Bauer 1999; Kellert *et al.* 2000; Clewell & Aronson 2006). Others explore or apply process-oriented approaches to restoration practically (Herath 2004; Dufour & Piégay 2009; Baker & Eckerberg 2013; Brancalion *et al.* 2014; Bernhardt *et al.* 2018). Different scholars refer to it in different ways, emphasizing some aspects of it over others. For example, Higgs (1997) determines process-oriented restoration as an expansion of ecological fidelity to include social criteria. On the other hand, Clewell & Aronson (2006), define it as a melding of different restoration paradigms, from technocratic to pragmatic. Others yet see it as a holistic approach focusing on collaborative decision-making (Randolph & Bauer 1999), a method to strive for balance between community and natural resources (Leach *et al*. 1999) or a framework that improves social and economic standings of the community (Kellert *et al.* 2000).

Higgs (1994), a leading and influential scholar in process-oriented restoration, claims that process-oriented restoration is a redefinition of restoration and an expansion of natural science. Restoration practices are rooted in what is known as ecological fidelity, a product-oriented approach built from structural replication, functional success and durability (Higgs 1994). Normally, ecological fidelity is research-based and carried out by scientists. Higgs claims that considering only ecological fidelity results in a technical, product-oriented definition of ecosystem restoration. Therefore, he suggests an expansion to include social criteria, based upon historical, social, political, cultural, aesthetic and moral contexts. Good restoration is a negotiated outcome for a specific site, based both on ecological knowledge and diverse stakeholder perspectives: "to this end it as much process as product oriented" (Higgs 1994 p. 339). Ecological fidelity of a sites restoration can offer tight guidelines, such as the necessity to reintroduce an endangered species with important ecological functions. However, diverse perspectives with equal weight will result in serious discussion, criticism and negotiation. The key to including these diverse perspectives is process-oriented restoration (Higgs 1994). More specifically,

18

Higgs calls for an inclusive *decision-making* process regarding design, implementation and management of restorations. Conclusively, Higgs claims that process-oriented restoration - an expanded, site-specific, socially aware approach to restoration - "offers the prospect of generating healthier relationships between people and the ecosystems in which they live" (Higgs 1994 p. 348).

Another influential article to the development of process-oriented restoration is Clewell & Aronson's (2006). It is an analysis and division of the motivations behind ecosystem restoration into 5 different rationales: technocratic, which is undertaken by government agencies to recover ecosystem services valuable to humans; biotic, for the perpetuation and conservation of local biodiversity; heuristic, to explore ecological principles in ecosystems to serve pedagogically; idealistic, to reaffirm a connection between nature and culture through cultural, personal and spiritual elements; and pragmatic, to restore natural capital and restore climate changes occurring due to anthropogenic pressure. Clewell & Aronson (2006) conclude that the rationales are inadequate individually. Technocratic and pragmatic rationale suffer from being overly bureaucratic and lack public support and understanding. The biotic and heuristic rationales lack enough justification to sanction restoration projects. The idealistic rationale is limited to small, uncomplicated projects, without need for technical and logistical support. Thus, Clewell & Aronson claim that good restoration is a melding between technocratic and idealistic rationales. Stakeholders will not support restoration projects without understanding its economic and societal values, whilst governments would be unable to generate political support for ambitious projects without public support. To do so, institutions that conduct technocratic restoration must relinquish some authority and work in partnership with the community. Conversely, local citizens must assume responsibility in the partnership and inject restoration projects with *cultural significance* (Clewell & Aronson 2006). This unified approach is not unlike Higgs': technocratic rationale – used to recover ecosystems through ecological fidelity – combined with idealistic rationale – which is social criteria based in human contexts (Clewell & Aronson 2006).

The most recurrent and called-for concepts from process oriented literature are *decision-making* and *cultural significance*. These concepts allow for an expansive scope of restoration.

2.4 Application of the framework to the case study

2.4.1 The final framework

In the framework proposed, the two concepts of process-oriented restoration rely upon the four features extracted from an analysis of CI in NRM. As determined, process-oriented restoration relies upon the concepts decision-making and cultural significance. Decision-making, in turn, is reliant on the three features, methods tailored to decision-making, participatory objectives and being philosophy based. They, in turn, are based upon their components. Cultural significance is based upon local knowledge and is philosophy-based, which are features based upon their components.

Table 2 presents the last step of the framework. The components will function as the base the framework will build from. The features function as an intermediary between the components and the concepts. The pyramid structure builds up to the approach, which is process-oriented restoration.
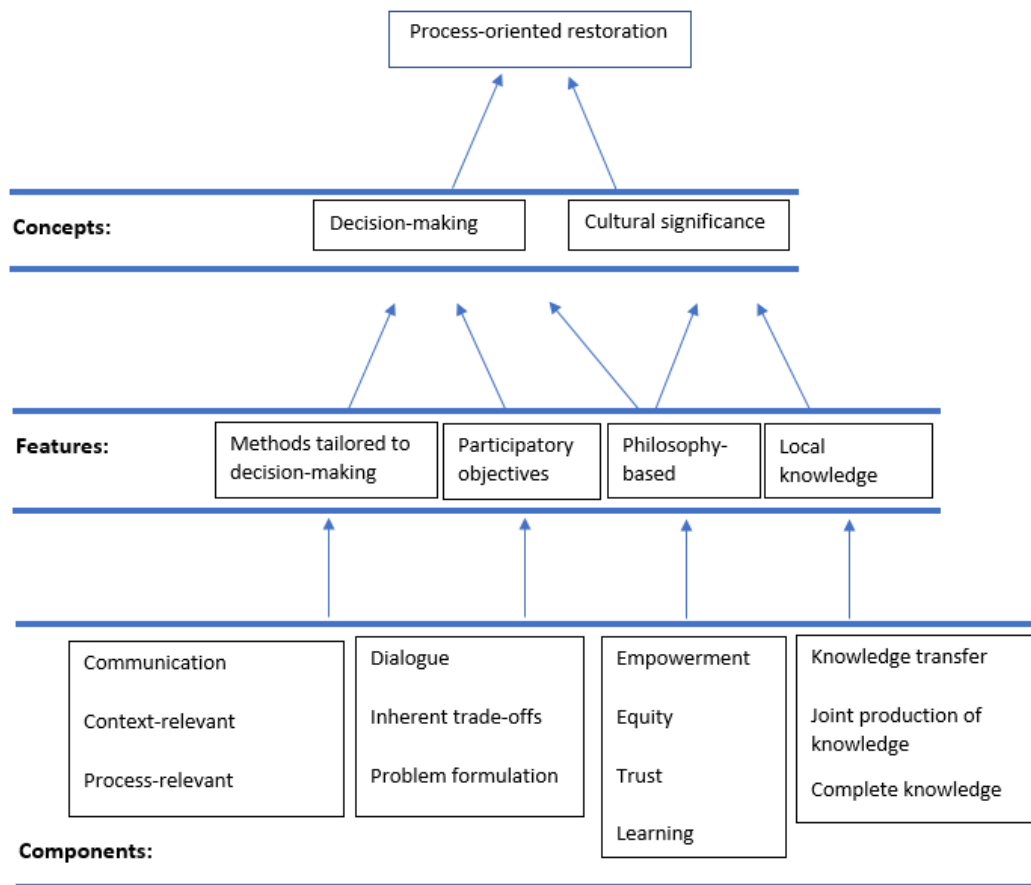
Table 2: the final process-oriented framework. Adapted from Reed (2008), Clewell & Aronson (2006) and Higgs (1994)

The framework outlined in *Table 2* will be used to analyze process-oriented restoration in the WWRP.

2.4.2 The WWRP's data

In order to analyse process-orientation in the WWRP, the components must be looked at. To analyse methods tailored to decision-making, focus needs to be given on how DoC communicates with the community, the influence that the socioeconomic and ecological context has upon the decisions and decision-making in relation to the timescale of the project. To analyse participatory objectives, focus need to be given to how DoC dialogues with the community, in what situation and what kind of trade-offs are achieved and how problem formulation is done. To analyse the underlining philosophy of the WWRP, focus needs to be given to the sense of personal efficacy that community members have and the capacity they have to engage with involvement, how trust is built and how DoC interacts in small groups or with individuals and the role of learning in the project and how DoC employees interpret learning. Lastly, to understand the interaction between local and scientific knowledge, focus needs to be on knowledge flows between the community and DoC, the type of knowledge that exists between them and how this knowledge is created.

3. Methodology

Here, the method of study is explained. Semi-structured interviews were conducted with key actors in the processes, including community leaders, local residents and authorities. The questions posed in interviews were explorative in nature and related to roles, activities and opinions of participants in the bottom-up process and its social and ecological outcomes. Field visits were conducted several times during the longitudinal study to observe and analyse socio-spatial transformations. Analysis of documents relating to policies and programmes obtained from different community organisations and government agencies was used to complement the interviews and field visits.

Firstly, I will explain my project design and data collection. Secondly, I will point out the limitations of my methodology. Lastly, I will detail the data analysis.

3.1 Project design and data collection

Creswell & Creswell (2018) plot a framework for research by connecting worldviews, research approaches, design, and research methods. In this framework, the worldview determines the research approach, which determines the project design and consequently the methods. My research design pertains to this framework. The underpinning worldview is *constructivism*, which is based upon: understanding, multiple participant meanings, social and historical construction and theory generation (Creswell & Creswell 2018). *Constructivism* typically has a qualitative research approach, which, according to Creswell & Creswell (2018), entails: open-ended questions so that the participants can share their views, seeking to understand the context of the participants by observation, gathering information personally and generation of meaning through inductive research from data collected.

This approach lead to the use of case study design. This is a research design where the researcher develops an in-depth analysis of a case, bounded by time and activity with detailed information collection (Creswell & Creswell 2018). The methods used pertain to qualitative methodology. Composed of emerging design and open-ended questions, it allows the researcher to collect data through interviews, observations, documents and audio-visual data. Lastly, the analysis of the data is through text, themes, patterns and interpretations (Creswell & Creswell 2018).

3.1.1 Sampling and interviewees

The interviewees were chosen according to the four aspects identified by Miles *et al.* (1994) and explained by Creswell & Creswell (2018), which are: the setting (where the research will take place), the actors (who will be observed or interviewed), the process (the evolving nature of events undertaken by the actors within the setting) and the events (what the actors will be observed or interviewed doing). The setting was Whangamarino. Interviewees were required to live there and/or work in the project. The interviewees were also required to be actors taking part of or witnessing events that regarded the WWRP. Another requirement was to having influence on the WWRP by affecting its process. It was not fundamental to the research to witness the interviewees in action (during activity, e.g. during a public consultation) but it would have been an added bonus. I deemed that DoC's Community Ranger (CR) would have contacts within the community and know community leaders and local residents, as well as represent DoC as the authority in the WWRP. For this reason, I

decided to apply snowball sampling, and consider the CR as a *node*.

Snowball sampling is a sampling method. It builds sample networks by spanning out from few select individuals (Franks *et al.* 2009). A first agent of interest is selected and approached. This first agent acts as a *node* and connects the researcher to the next group of agents, called first-order connections. They, in turn, connect the researcher to the second-order connections (McCulloh *et al.* 2013). When applied to the research, the CR functioned as a node. The objective was to acquire first-order connections with DoC staff and second-order connections with members of the community. The objective was to conduct 10 interviews with 8 different interviewees, of which at least 3 from the community and the rest DoC staff. Sampling was successful for first-order connections, allowing me to interview 6 interviewees in 3 separate interviews. In the latter interview information pertaining to all 4 of Miles & Huberman's (1994) aspects was gathered, and I was able to observe an employee interacting within the Whangamarino Wetlands. However, the sampling fell short of second-order connections. No interviews with the community were obtained. The reasons will be developed in the limitations section (3.3).

3.1.2 Interviews

Data was collected through 3 interviews with a total of 6 interviewees. The interviewees were all staff of the DoC. The interviews conducted were semi-structured expert interviews. According to Miles & Gilbert (2005), semi-structured interviews are used to discover the *why* rather than *how much*. They are defined as: "conversations in which you know what you want to find out about – and so have a set of questions to ask and a good idea of what topics to be covered – but the conversation is free to vary, and likely to change substantially between participants." (Miles & Gilbert 2005 p. 65). Expert interviews are, simply, interviews conducted to experts in their field. They are deemed to be a more efficient and concentrated method to gather data (Bogner *et al.* 2009).

The interviews were based on the two key concepts of the analytical framework, decision-making and cultural significance (see *Appendix A*). The objective was to let them freely reflect upon those two concepts so to pick up on any reference to the framework's components. Following the semi-structured interview format the interviews were loose and interviewees were given space to reflect freely. The interviews occurred over a time frame of 3 weeks, from the 14/02 to the 06/03. At the interviews various DoC employees participated.

The first interview functioned as an introduction to the WWRP, as well as a meet of the CR. It took place at the DoC offices in Hamilton. Present were three DoC employees: the Whangamarino CR, a Whangamarino Biodiversity Ranger (BR) and an intern BR. The two other employees were invited by the CR. The CR was new to the project, having only started 3 months prior to the interview. It was not recorded but extensive notes were taken: I deemed that building a relationship in a less formal context, without a recorder, would be a better approach to the first interview. The objective of the interview was three-fold: to gather general data about the Whangamarino Wetlands, to gather data regarding the degree of CI in the project and to set-up contact with the CR.

The objective of the second interview was to develop the data about CI by looking at the two key concepts. It also took place at the DoC offices in Hamilton. There were 4 employees: the CR, a BR, a Whangamarino field ranger (FR) and a Waikato Tainui river intern. Once again, the 3 other interviewees were invited by the CR. The Whangamarino FR is central to the restoration project, a long-term user and important stakeholder in the Whangamarino. The interview permitted me to develop the concepts regarding CI. I was able to access more in-depth information regarding the quality of CI in Whangamarino, as well as the analysing communication between DoC and the stakeholders. This interview was recorded and transcribed in detail.

In the last interview conducted I was given a guided tour around the

Whangamarino Wetlands by the FR. The FR's importance in the project was considerable. Having been in the Whangamarino for over 55 years as both a user and a ranger, his perspective was important. Thus, his figure became central to the research. The objective was to: follow-up important information by asking in-depth questions about the processes of CI, gathering information through observation, complementing written information with photography and exploring the different perspectives of the FR, who was involved in many different aspects of the wetlands. Throughout the interview, I was able to gather information through observation, as well as go into detail due to the extensive length of the interview (6 hours). The interview was recorded but only relevant information was transcribed due to its length.

3.1.3 Literature studies and observation

In order to gain a deeper understanding of CI in Whangamarino, and to apply the theoretical framework, a literature study was conducted. The literature study was divided according to the different methods. The first method pertained to literature searches on websites that could have information on Whangamarino. The first website accessed was the DoC website. "Whangamarino", "community involvement", "ecosystem restoration", "stakeholders" and "participation" were the key words used. Factual documents regarding the WWRP, restoration in Waikato and restoration in greater NZ were accessed through DoC's website, which proved to have documents and published literature. The documents were 4 project reports with empirical data regarding ecological fidelity and CI, ranging from the specifics of the WWRP to restoration on a national scale and international agreements. A meeting report between agencies was also found. The same methods were subsequently applied to online newspapers in NZ at both a local and national scale, such as: Stuff.co.nz, stuff.co.nz/waikato-times, nzherald.co.nz. However, only "Whangamarino", "community involvement" and "ecosystem restoration" were searched; the latter would give results too broad. Two articles regarding conflict between community members and DoC about wetland management were found.

       The second method was to gather documents in person once in NZ and on the field. The first step was going to a library to access information through the local VPN, which resulted in unrestricted access to all documents. The second step was asking DoC employees for any or all documentation on the WWRP. The last step was going to Stuff.co.nz headquarters in Hamilton and asking for any articles or news pieces regarding Whangamarino. All the documents available are found online, which I subsequently accessed.

3.2 Limitations

The main limitation to my research is in, and due to, the project design. At the core, this is an over-reliance on *emergent design* and snowball sampling.

       Emergent design is a concept from Creswell & Creswell (2018). It signifies that research cannot be strictly prescribed, and that some or more phases of the process may change or shift after the researcher enters the field and begins to collect data. The key idea behind qualitative research is to learn about the problem or issues from participants and to address the research to obtain that information. By relying too much upon emergent design, the design became based upon discovery rather than preparation. I expected the focus to be evident throughout the research. To use a metaphor, I expected to create a path through the forest as I walked it.

       Following the project design, I chose to use snowball sampling. One concern of snowball sampling is that the individuals included by the node might not be

relevant. In this case, the opposite occurred. Using the Whangamarino CR's knowledge of contacts as a tool seemed a good and dependable way to access the community, as well as being an accurate reflection of emergent design. The assumption was that in a 12-year project the CR had developed in-depth community relations. Thus, I expected to be put in touch with community members that have participated in the project. However, this never occurred, since there had not been a CR in the project for 7 years prior to 2018. The WWRP CR did not have enough contacts within the community for me to access. This research has proved opposite to the concern: the node did not know enough individuals to be included. When reflecting upon this, it is here that I should have applied emergent design by varying from the initial project design and changing my sampling method. This is easier said retrospectively. At the time, interviews with the community seemed likely due to the optimism and reassurance of DoC staff.

Conclusively, I misunderstood emergent design and applied it to the wrong part of the project. Snowball sampling allowed me to access other DoC staff with relevant and in-depth information, but with a lack of perspective. This led to interesting interviews but to less applicable data. The structure of the research changed after the field research had been completed. As a result, the theoretical discussion section was significantly expanded to add depth and scope to the fieldwork.

3.3 Data analysis

The process-oriented framework described in the theoretical discussion was used to analyse the transcribed data. Firstly, however, documentation regarding the WWRP was consulted to be used as baseline knowledge, without applying the framework. This was done in order to gain a more comprehensive understanding of the long-term objectives and the scale of involvement (which other institutions were involved, e.g. universities or political parties) of the WWRP. The documentation will be referred to in the results.

Secondly, the transcriptions were analyzed. The first step was identifying any reference to the components throughout the interviews. Identifying the components, their presence in the project and their importance to DoC will allow to draw conclusions on their presence. This will, in turn, allow to draw conclusions on the inclusion of the features, thus determining whether the WWRP is process-oriented.

4. Results

Here, the results will be presented. Contextual information regarding CI in the WWRP will be given. Following, there will be a synopsis of the results and an explanation of key findings. Any eventual correlations between findings regarding the components listed above will pointed out.

The result section will be divided in 3 sections. The first section will look at the objectives of CI in the WWRP. The second section will overview CI conceptually and practically. The third section will use the components above to determine how CI has been implemented. For references, the interviewees will be referred to as: DoC CR, DoC FR and DoC BR.

4.1 The Whangamarino Wetland Restoration Project

The Whangamarino Wetland Reserve is the second largest wetland on the North Island of NZ and lies 45 km north of Hamilton. It receives water from the Waikato River through the lake and is part of the Lower Waikato Waipa Flood Control Scheme (FCS) since 1965. Land use in the area is pastoral and has increased since the FCS. The FCS lowers the flood peak, thus reducing the damage to adjacent land, but in doing so inundates Whangamarino Wetlands. The value of floodwater capacity was estimated at $3.8 million (Duggan *et al.* 2013).

There are features of the wetland that are intrinsic to culture and tradition. Wetland resources, such as eels, birds and plants were utilized by early Māori tribes. The Whangamarino area was the site of several major battles between Māori and British troops in the Waikato War of 1863-1864. It is a popular game bird hunting site, with 748 ha owned by the Waikato Fish & Game Council, as well as being a renowned fishing and birdwatching location (Duggan *et al.* 2013).

As of July 2007, the DoC implemented the Arawai Kakariki (Green Waterway) Wetland Restoration Programme (AKWRP), an umbrella restoration project that includes Whangamarino Wetlands. It is a "flagship programme […] aimed at protecting, restoring and understanding these ecosystems with the assistance of community." (Duggan *et al.* 2013 p. 7). It is a pioneer project within conservation on a national scale. The objectives can be seen in *Table 3:*

Biodiversity	Community	Learning
Maintain the extent of the wetland habitat	Conserve historic and cultural sites	Undertake research to inform wetland management
Maintain and enhance water levels and quality	Promote sustainable land use	Develop best-practice wetland restoration tools
Protect and restore wetland habitat	Improve recreation and visitor facilities	
Maintain and enhance species diversity, including threatened species	Maximize community awareness and involvement	

Table 3: Objectives of the AKWRP

CI is coordinated and facilitated by the CR. It is their duty to encourage and plan involvement. Previous plans for CI were initiated by the former CR. These plans fell through when that CR left and was not replaced, leaving an important absence from 2011-2017 (DoC CR, DoC FR). The CRs duty is to work closely with the stakeholders, which are the following:

Stakeholders	Role
Department of Conservation (DOC)	Public
Waikato Regional Council (WRC)	Public
Waikato Fish & Game (WFG)	Public
Adjoining landowners	Private
Neighboring landowners	Private
Game bird hunters	Private
Fishers	Private
Other wetland users	Private

Table 4: primary stakeholders in the WWRP

Ultimately, the goal is to develop a best-practice wetland restoration tool for nationwide application. The best-practice restoration is defined as an ecohydrological model that can demonstrate the relationship between hydrology, ecology and wetland values. To do so, there has been significant investment in research and monitoring to update knowledge on species, particularly threatened ones (Duggan *et al* 2013; DoC FR).

4.2 An overview of CI in the WWRP

There is evidence of CI in the WWRP. Much of CI relies on initiative from the community. Firstly, the following section will give a preliminary and brief description of the type of CI found in the WWRP. Secondly, it will introduce the concepts and features found in CI before tying them in to the process-oriented framework.

According to DoC FR, the following types of community involved restoration are present in the WWRP: volunteer planting, weed control, pest control and restoration on private land. Volunteer planting is organized by DoC to plant trees in the wetlands. Gamebird hunters often commit to restoring ecological balance. They do this through weed and pest control. Through a ballot system they are given a small pond in the wetlands to use for recreation. To prolong their rights to hunting on that land they are obliged to maintain its conditions, which are often maintained because a balanced ecosystem means more game. As one DoC employee states: "*I think the wetlands would be far worse off if we didn't have duckshooters in there*" (DoC FR). Restoration can and does occur on private land when a landowner takes interest in the project. In one case the stakeholder started a restoration project on private land and used community groups to plant. In another, a stakeholder swapped his land for some farming land, and funded fencing and planting to make a business model out of it (DoC FR).
There are limitations to CI in the WWRP. The first and most important limitation is the lack of a CR for 6 years. This lack of a CR is described by the current CR as: "*There's the big failure of having that big gap already. Not a lot happening up until now*". Projects that were started at the beginning of the WWRP fell through due to this gap:

"*In terms of some of the community work that has happened, our BR did do a survey out to landowners – it wasn't specific research but to try and see what their engagement or, like,*

what they wanted from the community. But as I said last time, there was a huge gap without it." (DoC CR).

The current CR is making a communication plan aimed at including the new demographic to have intergenerational participation. The strategy is to "*have more mixed people*" in terms of age. DoC rangers want to include the newer generations due to the old age of the current wetland users and participants (DoC BR; DoC CR; DoC FR).

In summary, the data shows that there has been a discreet involvement in restoration. Restoration has occurred through key community groups, which are: volunteers, gamebird hunters and few individuals with intersecting interests with the WWRP. School volunteering is the most common type of community restoration, and occurs regularly (*Figure 2*) – many of these signs are present across the Whangamarino Wetlands. DoC staff aim to increase CI; however, they are still coping from the 6-year CR gap (DoC CR; DoC FR).

Figure 2: volunteer restoration sign in the Whangamarino Wetlands. Signs about school volunteering are common over the Whangamarino Wetlands (Nicholas Magnolfi 2019)

The most significant features and concepts related to CI in the WWRP are: *agency*, *learning*, *scientific and local knowledge*, *cultural attachment* and *decision-making*.

The results yield a pervasive sense of *agency* in CI. *Agency* is seen as: "The socially determined capability to act and make a difference." (Barker 2003). DoC encourage *agency* by fostering *empowerment* and *equity*. To *empower* is to ensure stakeholders have the technical capacity to engage with decisions. To *equalize* is to develop knowledge and confidence while providing education (Conger & Kanungo 1988; Reed 2008). There is extensive evidence of how the WWRP project relies upon the *agency* of individuals within the community.

The second, and perhaps most important feature, is *learning*. In the context of participation it is iterative and two-way, concerned with knowledge transfer from and to the community (Reed 2008). In the WWRP, *learning* is fundamental.

The third feature is *scientific and local knowledge*. The project is mostly informed by scientific knowledge. In the WWRP, scientific knowledge is understood as knowledge from the research and practitioners perspective. Academic research in the wetlands is encouraged and accommodated. Local knowledge, on the other hand, is understood as knowledge from the communities' perspective. In this case, local knowledge is interpreted as both skilled and cultural knowledge. Efforts to include local knowledge from different sub-communities, such as hunters or *iwi,* are present.

27

This leads to the concept of *cultural significance. Cultural significance* comes from the historical connection between the land and the community. There is a degree of cultural significance to the project, mostly arising from the history of the wetlands. The wetlands are a place of important cultural history regarding both Māori and Europeans. Pride over indigenous species is deeply rooted in Kiwi nationality, and the wetlands are home to various indigenous species found only in NZ. The combination of the human history and pride in indigenous species is an important aspect of the Whangamarino.

The fifth and last feature is *decision-making*. Joint *decision-making* for long-term plans occurs regularly in pre-set conditions. Successful communication is key, as are process and context-relevant decision-making.

The above features and components are evidence of a degree of process-oriented approach in the WWRP. The type of CI found ties into the framework proposed. Section 4.3 will look at these features in depth by using the framework from *Table 2* and applying the components described in the theoretical discussion.

4.3 Applying the components

4.3.1 Methods tailored to decision-making

The framework's components in methods tailored to decision-making are communication, context-relevance and process-relevance. Methods gain purpose once the objectives of a project have been agreed upon (Reed 2008). Methods of communication pertaining to the context and process of decision-making are present in the WWRP. Community-based decision-making occurs in the following 3 ways: 1) surveys 2) day-to-day decisions 3) long-term decisions (DoC FR). Methods of communication thus pertain to these different types of decision-making. Surveys were conducted postally and telephonically. A postal survey was chosen to get a sample of the community and understand more general perspectives on the WWRP. Day-to-day decisions are made with single stakeholders through dialogue, both direct and through a cellphone. Long-term decisions occur with agencies and multiple stakeholders. Open-days are held to include a higher quantity of stakeholders (Duggan *et al* 2013; DoC BR; DoC CR; DoC FR).

The first method tailored to decision-making is communication. Direct, face-to-face or cellphone communication is dependent upon the activity in question, such as day-to-day procedures or when rapid action is necessary. As a DoC staff interviewee has said: "*The day-to-day stuff in the wetland we sort of get on with what we're doing*." (DoC BR). An example of that is weeding. DoC once found a patch of alligator-weed, an invasive and damaging species, on a stakeholder's duck-pond. Having to act rapidly, an employee called him and told him that DoC need to take immediate action. The stakeholder was appreciative of DoC getting in touch with him (DoC FR). These cases are recurrent. The methods of communication in this case are direct or via cellphone, reflecting decision-making process based upon singular stakeholders.

The second method tailored to decision-making is context-relevance. Consultation occurs for issues on a larger time and space scale. Long-term decisions regarding all the wetlands are made through consultation: "*In the wider Waikato area there are plans that are put in place and that's all consulted with the public.*" (DoC BR). DoC co-manage the wetland with local *iwis*. Consultation with them occurs in public buildings. Consultation with the remaining community is done by hosting open days, where the community is urged to bring questions regarding the project. All related agencies are involved: the Waikato Regional Council, Waikato District Council and DoC. Landowners are contacted directly and invited to these public consultation days. In this case, decision-making is relevant to the cultural and social context. *Iwis* are consulted, as are all relative

28

agencies, in public buildings. Followingly, open-days are used to inform the remainder of the community (DoC BR; DoC CR; DoC FR). Methods are relevant to the context in consultation through recognition and involvement of key community groups and agencies.

The third method tailored to decision-making is process-relevance. In 2007, a survey regarding the restoration project was conducted by DoC (Duggan *et al.* 2013). The objective was to determine the most productive approach for DoC to engage with the local communities. The outcome indicators were: proportion of community with improved awareness of the WWRP, level of external interest, level of engagement of stakeholders with conservation at the site, number of partnerships that involve *tangata whenua* and number of volunteers who participate in conservation projects (Duggan *et al.* 2013). At the early stages of a project, it is necessary to gather and disseminate information (Reed 2008). Thus, the methods were: telephone, focus groups and records of website hits. This method accurately reflected the early stage of the project. Both quantitative and qualitative data methods were applied. The methods accurately reflected the initial stage of the process.

4.3.2 Clear objectives for participatory process

The framework's components in clear objectives for the participatory objectives are dialogue, trade-offs and problem definition. There is little evidence of formalized, participatory objectives that reflect the need to include dialogue, trade-offs and problem definition in the WWRP. The objectives stated in the Outcome Report are pragmatic and regard CI to achieve ecological fidelity (Duggan *et al* 2013). Dialogue, trade-offs and problem formulation are done with individual stakeholders. They are similar to the methods used in day-to-day decision-making. They are often dependent upon personal relationships. This form of dialogue creates the conditions to the deliberative approach, where argumentation takes precedence over negotiation (Reed 2008).

Dialogue in the Whangamarino is used to gain access to private land, to neutralize conflict, to deal with difficult community members and to enforce rules (DoC FR). When asked about how he conducts dialogue, a staff employee describes his process. He breaks the ice with common interests. For example, talking about duck-shooting: "*Being a kindred spirit always helps.*" (DoC FR). He then proceeds to organize a meeting and talk to the community member. If they are confrontational, he is patient and respectful, recognizing that everyone has their own ideas which need to be listened to. Once they are calmer, they can begin their dialogue, generally in the home of the community member. At which point, the employee takes out something to eat or drink. This technique has proven effective. In all cases, access to private land was given. In some cases, access to equipment was also given (DoC FR). This technique in dialogue had a secondary effect: it has created a sense of ownership of the process – some community members have consequently gotten involved in private restoration efforts. It has created long-lasting partnerships, professional and personal. Ongoing dialogue with a headmaster, sustained over the long-term, has resulted in a recurrent school planting project that has benefitted the pupils through outdoor education and benefitted the restoration project by planting and replanting 1000 trees (DoC FR). Dialogue in the WWRP is fundamental in involving individual stakeholders, community groups and building trust.

The type of trade-offs referred to by Reed (2008) are trade-offs inherent to the deliberative nature of the dialogue. In the WWRP, there is no evidence of these types of trade-offs. Face-to-face dialogue is to gain access to private lands and does not include reflective deliberation about the process of CI.

The dialogue explored in interviews is oriented toward problem-solving; in the face-to-face dialogue that characterizes the WWRP it takes priority over problem formulation. There is evidence, however, of problem formulation in the initial project design. According to Duggan *et al.* (2013), when a cultural values assessment undertaken

by DoC and Nga Muka Development Trust (a collective of local Māori sub-tribes) to assist in gathering historical and current information failed to be completed, it was deemed that strengthening the relationship between Nga Muka and DoC was necessary. The two agencies have a common objective: the protection, quantification and restoration of the wetland and its surroundings. There is evidence of problem formulation at an institutional level but does not occur with community members at a grassroots level.

4.3.3 Philosophy-based

The framework's components for a philosophy-based project are empowerment, equity, trust and learning. All four are present in the Whangamarino to various degrees. The components are not mentioned in the goals of the projects nor described in the documents. They are applied intuitively and often require the initiative of individual DoC staff and/or community members. Throughout the interviews, two of the four components came up, trust and learning. Only learning was reflected upon. Trust was merely mentioned.

The first of the four is empowerment. Empowerment creates conditions that motivate a sense of personal efficacy, wherein actors know that their involvement has influence (Conger & Kanungo 1988). A sense of personal efficacy has always been present within certain portions of the community of the wetlands. The first CI in the wetlands began before the project, when gamebird hunters established open-water ponds and starting planting programs (DoC FR). This sense of efficacy in gamebird hunters has persisted throughout the existence of the project. Gamebird hunters often get in touch with DoC of their own accord, mostly to acquire hunting licenses. For other community members, empowerment translates to ensuring that participants can both influence decisions and engage with them (Reed 2008). DoC insist upon the right to the final say in decision-making. The following statement, quoted from a DoC employee, sums up the situation:

"We would make most of the decisions, and if we can get a community group on-board, we would listen to their concerns. They might not agree with everything we want, and we might not agree with everything they want, but between us we could probably thrash out something that's going to be to the benefits of the wetlands." (DoC FR).

DoC are open to dialogue and pay attention to the community's concern, despite having the final say in decisions.

Equity, similar to empowerment, is based on having the technical capacity to engage with decision-making (Reed 2008). Stakeholders must be capable of participating by being equal. To do so, knowledge and confidence must be developed, and education to guide stakeholders in technical decisions should be provided (Reed 2008). In the WWRP there are the conditions for developing technical capacities from DoC to stakeholders. Here, technical capacities translates to teaching skills related to planting: planting, plant identification and seed sourcing (knowing where the plant is most likely to survive). "*Good if their leadership has some ecological background in it. But it's not a necessity, because we have that knowledge. If we can pass it on, then that's a success*." (DoC FR). Equity is also seen as the "distribution and allocation of socioeconomic benefits and resources" (Kellert *et al.* 2000 p. 707). DoC distribute some basic resources to private and public stakeholders, for example: they provide plants and help private restoration projects and provide equipment to schools when volunteering (DoC FR). DoC develop technical skills adequately and build a good knowledge basis for technical decision-making with the community.

Trust is part and parcel of DoC's CI strategy. Two effective trust building techniques are working with small groups and building opportunities to socialize. The former technique is exemplified in DoC's open-day and face-to-face communication strategies. In the first, DoC build trust through dealing with confrontation. As one employee

30

says: "*You have to be on your toes to put a positive argument out there.*" (DoC FR). In another case, a DoC employee went to meet all the landowners to inform them of future restoration directions. One employee uses the above dialogue strategy to build trust with hostile stakeholders. He uses common interests to break the ice with stakeholders, and then builds a personal relationship based on benefitting the wetlands. Building trust also occurred through volunteer planting. At one community planting DoC brought a barbeque and made lunch for the volunteers. According to a DoC employee: "*The long-term benefit and goodwill from it is well worth it.*" (DoC FR). DoC dedicate time and resources to trust building through face-to-face dialogue.

The last of the four components is learning. Learning is the philosophy upon which the WWRP was based:

"The Whangamarino in general was set up as a research project, so it was an example of how to manage the wetland and how to use that research in other places. So, the whole aspect that involves the community as well was 'how do we make this work?' and 'how do we carry it forward to other wetlands?"

The WWRP was set up as a pilot project to test wetland restoration. DoC employees use it to learn and then apply to other wetland restoration sites, of which there are three in total (DoC BR). This learning mentality is also evident in their day-to-day interactions with the community. One DoC employee said: "*I never stop learning. [...] The day we think we know it all is the day we should give up.*" (DoC FR). The interactions with the community are based upon two-way learning. What is learnt by DoC staff can be applied outside of Whangamarino. The iterative nature of volunteering – often happening on a regular yearly basis – is an indication of knowledge moving from DoC to the community and back. There is evidence of learning within the community as well. Class pupils stated that their favorite event of the year was a talk given by a FR about the wetlands. Learning plays a central role in the WWRP.

4.3.4 Integration of local and scientific knowledge

The framework's components in knowledge integration are knowledge transfer, joint production of knowledge and complete knowledge. Due to the WWRP orientation toward learning, the DoC staff reflect upon knowledge and its role often. It plays an important role in the day-to-day and long-term. Local knowledge, in the case of Whangamarino, is knowledge with two separate bases. One knowledge is in terms of skills and know-how, the other is ancestral and indigenous cultural knowledge. In the day-to-day, there are examples of skilled knowledge transfer. The use of local knowledge can be seen in recreational activities of community members in the wetlands.

There is evidence of transfers between local and scientific knowledge in the WWRP. In this context, DoC's knowledge is scientific, and the community groups' knowledge is local. The type of knowledge transferred is know-how and technical skills. When asked, a DoC employee states that DoC have learnt many skills already, and a secondary objective of knowing these skills is passing them on to community groups (DoC FR). It is not crucial that community members have ecological knowledge, because that is the type of knowledge DoC can pass on. This type of scientific knowledge is transferred in two contexts. One context is pedagogic. DoC staff often give talk in schools and present ecological knowledge regarding the Whangamarino. Furthermore, DoC staff go on camping hikes with school classes. The other context is practical. Much of the scientific ecological knowledge that DoC have is passed on in planting events (DoC FR). These events are treated as an opportunity for knowledge transfer. Knowledge transfer does not end there, however. The same DoC employee says:

"Whatever community groups are doing I'm always keen to pick their brains in case there's something that they know that I don't and can utilize. I teach predator trapping but I learn so much from community groups when I go and talk to them. Sometimes they have adapted something and when I look at it, I say: why didn't I think of that?" (DoC FR).

In this scenario, the knowledge is transferred from community groups to DoC. It exemplifies pragmatic knowledge, wherein the transfer pertains to a use of a tool or, in other cases, a skillset. It is often transferred in situations of practice, namely during pest-control trapping. In both situations, knowledge transfer occurs in large groups. Knowledge transfer is an important aspect of local and scientific knowledge.

Joint production of knowledge is where producers and users influence each other throughout restoration process, and where different forms of knowledge or know-how acquire the same value. There is little evidence of joint production of knowledge in the WWRP. The only example is where DoC and community groups produce knowledge through knowledge transfer when pest-control trapping (DoC FR).

Complete knowledge is a product of knowledge transfer and joint production of knowledge. It consists of having a complete understanding of all the different knowledge perspectives in by tapping into local knowledge. The data collected in the WWRP indicates that the knowledge basis is incomplete. Scientific knowledge is present and the focal point of the project. Local knowledge is present in terms of know-how. However, there is no evidence of local communities' cultural knowledge, despite the area being rich in cultural history.

4.3.5 Findings in relation to agency and learning

The key results in the WWRP demonstrate a certain sense of agency that permeates the project. In this case, agency is the capacity for community members to act (Barker 2003). The most successful instances of community-based decision-making communication and dialogue are on an agency scale. The lack of a CR has resulted in a CI project without a top-to-bottom plan. When DoC rangers interact with the community they often do so with their own initiative. One-on-one dialogue with community members has thus become central. However, trade-offs and joint problem formulation are not evident. Joint problem formulation has occurred at a larger scale in one case. There is no evidence of the effect it has had on the project.

The philosophical base of the project also reflects a sense of agency. Empowerment and equity have been present in certain community groups but are lacking in others. Trust building through dialogue in day-to-day communication and small-scale decision-making is extremely recurrent. It is a priority to DoC rangers (DoC FR). Knowledge transfer between user groups, communities and DoC is prioritized. However, the knowledge in question is rarely knowledge produced jointly. Furthermore, there seems to be a significant loss of knowledge in terms of cultural history, which results in incomplete knowledge.

Lastly, learning is structurally present in the project and can be found at all scales. It is fundamental to the project. This structural predisposition to learning is the strength of the WWRP. It is precisely this predisposition to learning that can forward the science/practice gap debate.

5. Discussion

Here, the results will be discussed. I will critically address its achievements and shortcomings in relation to the theoretical framework. I will discuss the findings of the WWRP. The last section will conclude with what it can bring to the science-practice gap.

5.1 Process-orientation in the WWRP

The WWRP does not fulfil all process-oriented components. In some cases, the practical application of the components is aligned with their definition. For example, trust, knowledge transfer and communication relevant to decision-making. In other cases, such as for trade-offs, joint problem formulation and joint production of knowledge, there was no evidence of the components. In even other cases, however, the components were only present for few select community groups and were not applied unanimously.

5.1.1 A selective use of components

Components are not used with equanimity toward the community. Some sections of the community are treated differently, depending upon the potential gains their involvement could bring to the wetlands.

Empowering and equity, as aforementioned, is to put the community in the position to make decisions, interact with those decisions, and have the technical capacity to do so (Reed 2008). This does not always occur. For example, there is a section of the community that is largely ignored. A DoC employee claims that the only use they can make of the wetlands is as a dumping ground, and that DoC is up against them as a community (DoC FR). No solution has been suggested, and when an employee was asked, they said there is not much hope in changing this situation. Approaching this section of the community and building the technical capacity to interact with decision-making should be considered. However, they have seemingly been ignored due to the challenging socio-economic situation.

Dialogue has been cited as being an effective approach to build trust and to make small-scale decisions that affect the day-to-day functions of the WWRP. In some cases, it has gone beyond expectations, and given DoC access to equipment. However, with a section of the community who see the wetlands as potential farming land dialogue does not occur (DoC FR). It is seemingly applied selectively with community members that whose views are aligned with DoCs. There is no evidence of attempted dialogue. Building trust with this section of the community should be considered.

5.1.2 A lack of complete knowledge

Complete knowledge is a consideration of all perspectives. Clewell & Aronson (2006), in their understanding of the type of knowledge in cultural significance, describe two different types of knowledge. In one, connection to the land is a connection based upon use, much like how farmers are connected to their land (Clewell & Aronson 2006). In the other the connection is a spiritual and cultural connection to the land due to cultural identity. Ideally, in an area where there are indigenous peoples and user groups, both perspectives should be present. The WWRP qualifies as such an area. Furthermore, the Whangamarino is an area rich in cultural and indigenous history with important events that form the backbone of NZ's cultural history. However, there is little evidence of the cultural perspective.

Both the gamebird hunter and pest-control trappers' perspective are considered by DoC. As seen above, there is two-way knowledge transfer between this user group and DoC rangers. Knowledge transfer is also evident in know-how when it comes to volunteers in the wetlands. Hence, due to a mixture of active participation and personal connections, knowledge transfer and joint production of knowledge thus far have been oriented toward user groups (DoC FR).

There is some evidence of cultural knowledge within the project: a community member has approached a DoC ranger to acquire feathers of a native bird to create dresses are used to bury Māori chieftains in as a mark of respect for them (DoC FR). The historical conflict that occurred was referred to by DoC rangers (DoC BR; DoC CR; DoC FR). However, overall, there is significant detachment from the cultural history in the Whangamarino. This is can be seen in a DoC initiative. In this initiative, DoC allocated a sign with free space on it. This space was for local *iwis* to put "*an* iwi *perspective*" (DoC FR). However, after 10 years it still has not been used due to internal disagreement on legitimacy of usage. The sign in question is in *Figure 3*, where it is evident that no efforts to add an iwi perspective have been made. In another case, an area with an overview of the wetlands an information sign regarding historical events was allocated in an attempt to encourage visitors. However, the area had no evidence of being visited and was falling into disrepair. The DoC FR claims that this also reflects a trend of detachment from the rich Māori history of the Whangamarino.

Figure 3: the area allocated for the iwi *perspective* (photo: Nicholas Magnolfi. 2019)

The lack of cultural knowledge in terms of transfer and production is evident and observable. The development of perspective and gathering of knowledge is focused upon the know-how of user groups, due to their active involvement. An expansion of the cultural knowledge perspective is necessary for there to be complete knowledge, and, by extension, cultural significance.

5.1.3 Process-orientation in the WWRP

The WWRP is process-orientated to a certain degree. There is evidence of the application of some components whilst there is no evidence of others. The results show methods to be tailored to the decision-making are present. The objectives for the participatory process are

only present with dialogue. The project is philosophy-based: empowerment and equity are present; trust and learning are fundamental. Lastly, integration of local and scientific knowledge occurs only with knowledge transfer. Joint production of knowledge occurs only for certain types of knowledge, namely know-how. Complete knowledge, as seen above, is not present.

Overall, DoC still retain the final decision, but are known to consult the community. Community decision-making is mostly present with large scale decisions (DoC BR). The community is consulted and have a say. The following day-to-day decision-making is only shared when the decision immediately impacts a stakeholder (DoC FR). However, to explore this claim, an open-day consultation needs to be attended.

Cultural significance, on the other hand, is lacking. Once again, philosophy-based components are present. Wetland users and volunteers have injected cultural significance into the project. Nonetheless, there is a lack of consideration of cultural perspective due to a lack of involvement by those who could give perspective. Efforts by DoC should be made to include those who hold that information. Only then can the project be culturally significant.

Learning is the cornerstone of the project. The idea of the AKWRP is to generate knowledge in 3 different wetlands to apply to one another. Thus, DoC's practicalities in the WWRP are intrinsic to learning. This approach is fundamental in relation to future management plans. Despite the WWRP only being process-oriented to a certain degree, this underpinning philosophy could eventually lead to a fulfillment of the components necessary to a process-oriented project. This premise is applicable to the science-practice gap and will be explored in the final section (5.3).

5.2 General trends in the WWRP

The results yield a pervasive sense of agency in CI. Here, let us consider agency as community individuals' or groups' actions. Agency has been present in the WWRP since the beginning of the project. Early days restoration was by gamebird hunters, who acted out of their own initiative. In some cases, they formed groups and worked together to establish open water ponds. In others, they did individual pest-control trapping and consulted DoC only at a later stage. The gamebird hunters' actions at the early stages of the project caused practitioners to base the project around that initiative. As a result, the organization of the WWRP has been influenced. This is still evident today. When asked about CI in the Whangamarino, the rangers often spoke as if it were to be expected rather than encouraged. A strong sense of agency is also evident in practitioners, who organize the project.

DoC and their rangers are the practitioners and key authority in the project. However, it is still surprising to see the role that a single DoC ranger has in the project and the effects this has on stakeholders. In this case, it is a long-term ranger, user and inhabitant of Whangamarino. He is described by others as the "*key to the wetlands.*" (DoC BR). This is due to two characteristics of his persona in relation to the community and wetlands: experience and identity.

According to Cook & Wagenaar (2012), identity and experience are interrelated in practice, and one defines the other: "we define our identity in terms of our experiences with membership in various groups*"* (p. 33). In other words, identity is built through experiences as part of a certain group. The DoC ranger in question has a dual identity. He has had a lifetime of experience in the wetland, firstly as a user and then a ranger. He has implied that he identifies as a gamebird hunter due to his prolonged membership within the gamebird hunters' group (DoC FR). His experience as a gamebird hunter is significant. He claims to be a "*kindred spirit*" (DoC FR) of gamebird hunters and uses this to approach community members. This identity is then brought to DoC, where

colleagues claim he is the key to the wetlands. His numerous years of experience in DoC, the behaviour of his colleagues and his knowledge of the wetlands also imply his identification as a DoC ranger. His capacity to be a *dual identity practitioner*; to identify and be accepted as a member of both groups, is the key to a functional relationship between stakeholders he builds personal bonds with – namely gamebird hunters – and DoC. The importance of an individual DoC ranger, and his capacity to act, highlights the central role of agency in structural CI in the WWRP.

5.3 The WWRP and the science-practice gap

The science-practice gap is determined by a dichotomy between practitioners and researchers, wherein the former call for broad across-site theory and the latter site-specific practicality. An answer to this dichotomy is ecosystem restoration as informing practice and practice informing research. Process-oriented restoration can offer across-site theory and site-specific practicality. The expansion of ecological fidelity to include social criteria and focusing on the process of setting these criteria by tailoring decision-making and cultural significance to the local community can offer exactly that. Despite the WWRP not fully meeting process-oriented criteria, it is still relevant to the science practice-gap. The following are two approaches that could contribute to the science/practice debate.

The WWRP is informed by research in ecological fidelity and practical testing of CI, which is both undertaken and applied there. Results in restoration are then exported to other wetlands. By exploring practical solutions in the WWRP and then applying them to other restoration projects practice is informing research. The difference in site means that not all results can be applied to other wetlands. However, this is a step toward across-site theory and site-specific practicality. This is due to learning. The WWRP's predisposition to learning is ultimately the link between the mutual informing of research and practice. DoC use the project to learn and apply these to a greater scale.

An interesting result was the role of a key agent who, by identifying in two different groups, could foster CI. This agent has been referred to as a *dual identity practitioner.* His capacity to function as an intermediate between different groups has potential. Accessing an individual of that caliber within the park, who has the capacity of bridging gaps, could be useful. Thus, the following suggestion could be an effective manner to reduce the gap: identifying a *dual identity practitioner* and making them the key member of the the project. Their deep connection to the project, ability to encourage involvement through personal relations and ability to communicate with researchers through a feeling of respect should be fundamental to ecosystem restoration.

6 Conclusion

In this study I have highlighted a significant science-practice gap in the field of restoration and the use of an emergent restoration paradigm that could offer a solution to that problem. Applying process-oriented restoration as a restoration technique could offer both site-specific practicality and an across-site theory due to its dynamic community-based components without taking weight away from ecological fidelity. When applied to the case-study, it brings attention to the processes of involvement. In this case, it focuses on the efforts by the local authority to include the community. The results show that the WWRP does not fulfil all the process-oriented criteria. However, due to its predisposition to learning, it is legitimate to imagine a future where it fulfils all the criteria. Precisely this predisposition to learning is the most important finding of the research. I suggest that *learning* and a *dual-identity practitioner* have the potential to address the science-practice gap and increase the interactions between researchers and practitioners.

The present research analyses the application of a previously undefined framework. The results and discussion aim to contribute to two ongoing debates simultaneously: a more serious and balanced consideration of social criteria in a field where ecological fidelity is prioritized and the bridging of the science/practice gap. I recommend future research be on projects that make efforts to bring practical approaches to research as the WWRP does. Alternative methods of integrating research and practice should be researched in order to have a broader understanding of concepts that can aid in bridging the gap.

References

Aronson, J., Clewell, A.F., Blignaut, J.N. & Milton, S.J. (2006). Ecological restoration: A new frontier for nature conservation and economics. *Journal for Nature Conservation*, vol. 14 (3), pp. 135–139

Baker, S. & Eckerberg, K. (2013). A policy analysis perspective on ecological restoration. *Ecology and Society*, vol. 18 (2). Available at: http://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-71128 [2019-06-12]

Barker, C. (2003). *Cultural Studies: Theory and Practice*. SAGE.

Bernhardt, E.S., Sudduth, E.B., Palmer, M.A., Allan, J.D., Meyer, J.L., Alexander, G., Follastad-Shah, J., Hassett, B., Jenkinson, R., Lave, R., Rumps, J. & Pagano, L. (2018). Restoring Rivers One Reach at a Time: Results from a Survey of U.S. River Restoration Practitioners. *Restoration Ecology*, pp. 482–493

Bogner, A., Littig, B. & Menz, W. (2009). *Interviewing Experts*. Springer.

Brancalion, P.H.S., Cardozo, I.V., Camatta, A., Aronson, J. & Rodrigues, R.R. (2014). Cultural Ecosystem Services and Popular Perceptions of the Benefits of an Ecological Restoration Project in the Brazilian Atlantic Forest. *Restoration Ecology*, vol. 22 (1), pp. 65–71

Burbidge, A.H., Maron, M., Clarke, M.F., Baker, J., Oliver, D.L. & Ford, G. (2011). Linking science and practice in ecological research and management: How can we do it better? *Ecological Management & Restoration*, vol. 12 (1), pp. 54–60

Cabin, R.J., Clewell, A., Ingram, M., McDonald, T. & Temperton, V. (2010). Bridging Restoration Science and Practice: Results and Analysis of a Survey from the 2009 Society for Ecological Restoration International Meeting. *Restoration Ecology*, vol. 18 (6), pp. 783–788

CBD (2018). *Ecosystem Restoration / Convention on Biological Diversity. Convention of Biological DIversity / Restoration*. Available at: https://www.cbd.int/restoration/introduction/ [2019-05-15]

Clewell, A.F. & Aronson, J. (2006). Motivations for the Restoration of Ecosystems. *Conservation Biology*, vol. 20 (2), pp. 420–428

Conger, J.A. & Kanungo, R.N. (1988). The Empowerment Process: Integrating Theory and Practice. *The Academy of Management Review*, vol. 13 (3), pp. 471–482

Cook, S.D.N. & Wagenaar, H. (2012). Navigating the Eternally Unfolding Present: Toward an Epistemology of Practice. *The American Review of Public Administration*, vol. 42 (1), pp. 3–38

Creswell, J.W. & Creswell, J.D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. SAGE Publications Inc*. Available at: https://us.sagepub.com/en-us/nam/research-design/book255675 [2019-11-03]

Daily, G., Alexander, S., Ehrlich, P., Goulder, L., Lubchenco, J., Matson, P., Mooney, H., Postel, S., Schneider, S. & Tilman, D. (1997). Ecosystem Services: Benefits Supplied to Human Societies by Natural Ecosystems. *ecol*, vol. 1, p. 1

David, E., Dixon, K.W. & Menz, M.H.M. (2016). Cooperative Extension: A Model of Science–Practice Integration for Ecosystem Restoration. *Trends in Plant Science*, vol. 21 (5), pp. 410–417

Department of Conservation (1996). *Ecosystem restoration on Mainland New Zealand*. Available at: https://www.doc.govt.nz/about-us/science-publications/conservation-publications/land-and-freshwater/land/ecosystem-restoration-on-mainland-nz/ [2019-01-24]

Department of Conservation (2007). The economic values of Whangamarino Wetland. *Department of Conservation*,

Dickens, S.J.M. & Suding, K.N. (2013). Spanning the Science-Practice Divide: Why Restoration Scientists Need to be More Involved with Practice. *Ecological Restoration*, vol. 31 (2), pp. 134–140

Dufour, S. & Piégay, H. (2009). From the myth of a lost paradise to targeted river restoration: forget natural references and focus on human benefits. *River Research and Applications*, vol. 25 (5), pp. 568–581

Duggan, K., Roberts, L., Beech, M., Robertson, H., Brady, M., Lake, M., Jones, K., Hutchinson, K. & Patterson, S. (2013). Arawai Kakariki Wetland Restoration Programme: Whangamarino Outcomes Report 2007-2011. Department of Conservation.

Dunn, W.N. (1988). Methods of the Second Type: Coping with the Wilderness of Conventional Policy Analysis. *Review of Policy Research*, vol. 7 (4), pp. 720–737

European Commission (2019). *Maintain and restore ecosystems – Target 2 - Environment - European Commission. European Commission*. Available at: http://ec.europa.eu/environment/nature/biodiversity/strategy/target2/index_en.htm [2019-01-25]

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration*. University of California Press.

Herath, G. (2004). Incorporating community objectives in improved wetland management: the use of the analytic hierarchy process. *Journal of Environmental Management*, vol. 70 (3), pp. 263–273

Higgs, E. (1994). Expanding the Scope of Restoration Ecology. *Restoration Ecology*, vol. 2 (3), pp. 137–146

Higgs, E. (2017). Novel and designed ecosystems. *Restoration Ecology*, vol. 25 (1), pp. 8–13

Higgs, E., Harris, J., Murphy, S., Bowers, K., Hobbs, R., Jenkins, W., Kidwell, J., Lopoukhine, N., Sollereder, B., Suding, K., Thompson, A. & Whisenant, S. (2018a). On principles and standards in ecological restoration. *Restoration Ecology*, vol. 26 (3), pp. 399–403

Higgs, E.S. (1997). What is Good Ecological Restoration? *Conservation Biology*, vol. 11 (2), pp. 338–348

Higgs, E.S., Harris, J.A., Heger, T., Hobbs, R.J., Murphy, S.D. & Suding, K.N. (2018b). Keep ecological restoration open and flexible. *Nature Ecology & Evolution*, vol. 2 (4), p. 580

Hobbs, R.J. (2007-06-01). *Setting Effective and Realistic Restoration Goals: Key Directions for Research. Restoration Ecology*. DOI: https://doi.org/10.1111/j.1526-100X.2007.00225.x

Jordan, W.R., III, W.R.J., Gilpin, M.E. & Aber, J.D. (1990). *Restoration Ecology: A Synthetic Approach to Ecological Research*. Cambridge University Press.

Kellert, S., Mehta, J., Ebbin, S. & Lichtenfeld, L. (2000). Community Natural Resource Management: Promise, Rhetoric, and Reality. *Society & Natural Resources*, vol. 13 (8), pp. 705–715

Leach, M., Mearns, R. & Scoones, I. (1999). Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management. *World Development*, vol. 27 (2), pp. 225–247

Lowe, L. (2016-11-28). The importance of community involvement in ecological projects – reflections from #ERA2016conf. *Ecology Ngātahi*. Available at: https://aucklandecology.com/2016/11/28/the-importance-community-involvement-in-ecological-projects-reflections-from-era2016conf/ [2019-04-09]

McPherson, E.G. & Johnson, C.W. (1988). A community forestry planning process: Case study of citizen participation. *Landscape and Urban Planning*, vol. 15 (1), pp. 185–194 (Special Issue: Urban Forest Ecology)

Miles, J. & Gilbert, P. (2005). *A Handbook of Research Methods for Clinical and Health Psychology*. Oxford University Press.

Miles, M.B., Huberman, A.M., Huberman, M.A. & Huberman, P.M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. SAGE.

Misztal, B. (2013). *Trust in Modern Societies: The Search for the Bases of Social Order*. John Wiley & Sons.

Phillipson, J. & Liddon, A. (2007). Common Knowledge? An Exploration of Knowledge Transfer. *RELU Briefing Paper Series*,. Available at: https://eprint.ncl.ac.uk/54838 [2019-11-03]

Prell, C., Hubacek, K., Reed, M., Quinn, C., Jin, N., Holden, J., Burt, T., Kirby, M. & Sendzimir, J. (2007). If you have a hammer everything looks like a nail: traditional versus participatory model building. *Interdisciplinary Science Reviews*, vol. 32 (3), pp. 263–282

Putnam, R.D., Leonardi, R. & Nanetti, R.Y. (1994). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press.

Randolph, J. & Bauer, M. (1999). Improving Environmental Decision-Making Through Collaborative Methods. *Review of Policy Research*, vol. 16 (3–4), pp. 168–191

Reed, M.S. (2008). Stakeholder participation for environmental management: A literature review. *Biological Conservation*, vol. 141 (10), pp. 2417–2431

Robertson, H., Rance, B., Betts, H. & Pomeroy, E. (2018). Loss of wetlands since 1990 in Southland, New Zealand. *New Zealand Journal of Ecology*,. DOI: https://doi.org/10.20417/nzjecol.43.3

Saunders, A. & Norton, D.A. (2001). Ecological restoration at Mainland Islands in New Zealand. *Biological Conservation*, vol. 99 (1), pp. 109–119

SCHUSLER, T.M., Decker, D.J. & PFEFFER, M.J. (2003). Social Learning for Collaborative Natural Resource Management. *Society & Natural Resources*, vol. 16 (4), pp. 309–326

Steinman, A.D., Havens, K.E. & Hornung, L. (2002). The Managed Recession of Lake Okeechobee, Florida: Integrating Science and Natural Resource Management., 2002.

Suding, K.N. (2011). Toward an Era of Restoration in Ecology: Successes, Failures, and Opportunities Ahead. *Annual Review of Ecology, Evolution, and Systematics*, vol. 42 (1), pp. 465–487

Tippett, J., Handley, J.F. & Ravetz, J. (2007). Meeting the challenges of sustainable development—A conceptual appraisal of a new methodology for participatory ecological planning. *Progress in Planning*, vol. 67 (1), pp. 9–98 (Meeting the challenges of sustainable development-conceptual appraisal of a new methodology for participatory ecological planning)

Towns, D.R. & Ballantine, W.J. (1993). Conservation and restoration of New Zealand Island ecosystems. *Trends in Ecology & Evolution*, vol. 8 (12), pp. 452–457

United Nations (2019-03-01). *New UN Decade on Ecosystem Restoration offers unparalleled opportunity for job creation, food security and addressing climate change*. *UN Environment*. Available at: http://www.unenvironment.org/news-and-stories/press-release/new-un-decade-ecosystem-restoration-offers-unparalleled-opportunity [2019-04-26]

Walker, G., Devine-Wright, P., Hunter, S., High, H. & Evans, B. (2010). Trust and community: Exploring the meanings, contexts and dynamics of community renewable energy. *Energy Policy*, vol. 38 (6), pp. 2655–2663 (The Role of Trust in Managing Uncertainties in the Transition to a Sustainable Energy Economy, Special Section with Regular Papers)

Appendix A: Interview guide

The first two interviews were divided in the following steps:

Step 1: Background information about the interviewee

- Are you from the area?
- How did you come about working there?
- How long have you been there?

Step 2: Data about community involvement

- How do you involve the community?
- Who are the key stakeholders?
- Is the community keen on getting involved?
- Is there a strong cultural attachment?
- Who is the decision-maker?
- How are decisions made?
- Were there any key sources of support or resistance?
- What skills came into play?

Step 3: Reflecting upon the role

- What did you learn from the community? What did they learn from you?
- Any surprises? Any failures?
- What does this project say about community involvement?
- Are there any stories or events that really stand out?
- DO you see your contributions to community involvement successful? In what way?

I knew the third and last interview would be unusually long. I prepared the interview accordingly. I chose to focus on the two concepts of decision-making and cultural significance but to let the interviewee reflect upon them freely. This was an effort to ensure that the conversation would continue organically and consistently. I also wanted to see what components were in the project without bringing them up. The two main questions/themes that I came back to were:

- What significance does this area have to the community culturally? Is the attachment to the history strong?
  And
- How, with whom, when and where decision-making occurred