IDEEA Group

Integrated Catchment Management Evaluation Framework

A Multiple Capital Accounting Approach

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1 INTRODUCTION

The DELWP Corporate Plan aims to enhance its ongoing commitment to sustainable development both locally and globally (DELWP 2019-23). As the State's lead agency promoting and delivering sustainable development in Victoria, DELWP are uniquely positioned to provide leadership across Victoria and contribute to global sustainability.

DELWP is using the United Nations Sustainable Development Goals (SDG) to guide their efforts in the pursuit of sustainable development. The SDGs aim to reduce poverty and inequality, promote prosperity and well-being for all, protect the environment and address climate change and encourage good governance, peace and security. The SDGS have been aligned with the outcomes in the DELWP Corporate Plan 2019-2023:

- zero emissions, climate-ready economy and community
- healthy, resilient and biodiverse environment
- safe, sustainable and productive water resources
- reliable, sustainable and affordable energy services
- productive and effective land management
- a safe and quality built-environment
- sustainable and effective local governments
- reduced impact of major bushfires and other emergencies on people, property and the environment.

The Environmental Contribution is one of the most important funding tools assisting Victorians to manage water sustainably, and a means of accounting for the environmental costs associated with the provision of water-based services. Under a 2004 amendment to the Act, environmental contributions are collected to fund initiatives that seek to promote the sustainable management of water or address adverse water-related environmental impacts including Our Catchment Our Communities (OCOC).

The Our Catchment Our Communities (OCOC) Strategy has been designed to deliver integrated solutions at the catchment level to achieve the DELWP 2019-2023 outcomes. The OCOC strategy aligns with supporting DELWP strategies:

- DELWP 2020 Framework – aiming to (i) Increase the health of waterways and catchments; (ii) increase suitable habitat for species; (iii) Increase the sustainable management of public and private land; (iv) Increase satisfaction of Traditional Owners in land management decision-making and practices; and (v) Effectively protect cultural and natural heritage.
- Water for Victoria, Chapter 3: Strengthening integrated catchment management across Victoria; and Invest in integrated catchment management
- Biodiversity 2037: Goal 1: Victorians value nature; and Goal 2: Victoria's natural environment is healthy

The OCOC focuses on the coordination of planning, investment and on-ground activities to effectively and efficiently achieve a range of environmental, economic and social outcomes. The OCOC uses an Integrated Catchment Management (ICM) approach to guide investment to achieve the following goals:

i. Effective community engagement in catchment management
ii. Better connections between state, regional and local planning
iii. Strengthened implementation of Regional Catchment Strategies

iv. Clearer roles, strengthened accountability and coordination
v. Improved monitoring, evaluation and reporting

This document describes an outcomes-based framework for evaluating ICM projects in the OCOC areas. It describes: (i) the evaluation framework, (ii) the multiple capitals, (iii) concepts for evaluating investment in capitals and (iv) using the evaluation framework in practice.

2 ICM – EVALUATION FRAMEWORK

Integrated Catchment Management (ICM) is the coordinated planning and management of land, water, biodiversity, coasts and marine environments. These environmental domains form part of a spatially connected system that is managed to deliver integrated outcomes. Using social networks, partnerships and collaboration, ICM helps to deliver environmental, economic, and social (cultural) benefits to local communities based on their values and priorities.

The process for delivering on ICM involves the coordinated investment and use of human, social, natural and produced capital across catchments. Sustainable use of the capitals can help maximise environmental, economic and social benefits without compromising the wellbeing of future generations.

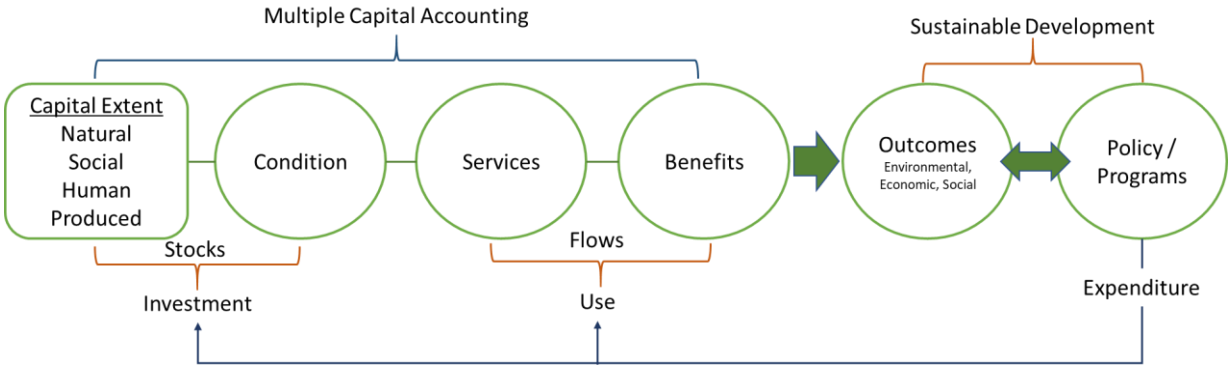
The ICM – Evaluation Framework (ICM-EF) presented in this report is modelled on the United Nations System of Environmental-Economic Accounting framework (SEEA 2012) and the TEEB AgriFood Evaluation Framework (2018). The use of TEEB Agrifood and SEEA as two internationally established frameworks provides the foundation for reporting on multiple capitals (social, human, natural and produced) and spatially integrated environmental accounting for investment analysis, respectively. The use of environmental accounting aligns well with several other existing policy initiatives at the state and national levels including:

- Valuing and accounting for Victoria's environment: Strategic Plan 2015-2020
- Protecting Victoria's Environment – Biodiversity 2037, Chapter 5 Linking our society and economy to the environment
- State of the Environment Report 2018
- Draft Marine and Coastal Policy 2019
- Victorian Catchment Management Council (VCMC) – Catchment Condition and Management report 2018
- National Strategy on the Implementation of the SEEA (2018)

Figure 1 below shows a general schematic of the Integrated Catchment Management Evaluation Framework (ICM-EF). This rest of this section describes the key elements of the ICM-EF which includes:

- The Multiple Capital Accounting approach using the accounting guidelines and principles contained in the SEEA.
- Multiple capitals within the core accounting model building on the TEEB Agrifood (Capitals – far left circle).
- Sustainable development objectives (environmental, economic and social outcomes) that are linked to policy and programs.
- Expenditures to come from policy and programs that are directed into capital investment and or use.

Figure 1. Integrated Catchment Management – Evaluation Framework (ICM EF)



Interpretation of the framework begins on the right-hand side with the development of a policy and program that aims to achieve a set of outcomes that contribute to sustainable development. The expenditure associated with a particular policy or program can either be used to change the stock of capitals (see far left of diagram), or employ the services provided by existing capital. These expenditure types can be used in isolation or together to achieve a set of outcomes. One key difference between the two types of expenditure is that investment in the stock of capitals is likely to change the capacity to deliver services into the future. Conversely, unsustainable use can see the capacity of a capital degrade over time.

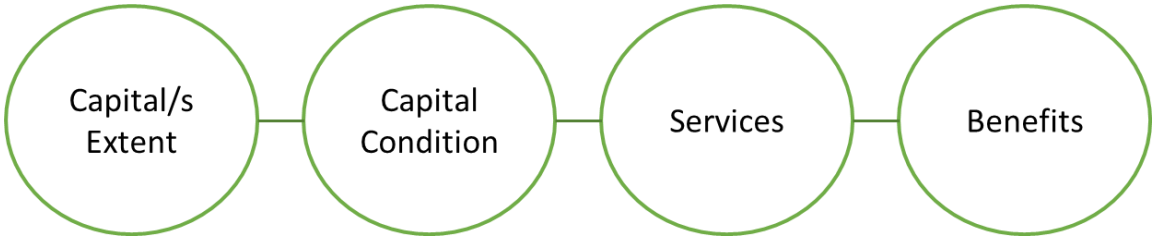
2.1 Multiple capital accounting (MCA)

The framework for multiple capital accounting (MCA) is shown in Figure 2.[1] MCA is designed to spatially integrate information on water, land, people, communities, ecosystems, biodiversity and the economy. It supports the notion that the Victorian landscape is spatially diverse, and catchments provide multiple benefits to many beneficiaries. The MCA has four main features:

1) the use of common accounting principles, structures and classifications that enable the measurement of capital condition and capital services in conjunction with each other and with standard measures of economic activity.
2) the use of a spatially systemic view of the relationships among the various types of capitals (human, social, natural, produced)
3) the capacity to assess the impacts on capital of economic and other human activity
4) link changes in capital to the measurement of environmental pressures (such as air emissions and climate change)
5) the use of a rigorous, spatially based approach to measurement that complements the typical national level focus and links to rivers, wetlands, marine and terrestrial ecosystem assets.

[1] MCA is based on the Core Ecosystem Accounting Framework (CEAF), (Eigenraam, M., Obst, C. 2018, United Nations et al., 2014)

Figure 2. Multiple Capital Accounting (MCA)



MCA involves accounting for four key components:

1) **Capital extent** reflects the quantity of a capital in a geographic area (catchment).
2) **Capital condition** addresses the condition (quality or health) of each capital in terms of a level or trend in specific characteristics of the capital. A condition measure based on various metrics (for example, ecosystem diversity, education) can be estimated for each capital in a catchment. A decline in capital condition is linked to capital degradation and is relevant to the analysis of capacity, sustainability and resilience.
3) **Capital services** in are the services that each capital provides. The focus in MCA is on the production and/or provision of services by each capital. For instance, the natural capital provides provisioning and regulating services that are used by economic units (individuals, households, business entities and government). Human, social and produced capital services supplied by economic units to other economic units (for example labour services, networking services, equipment).
4) **Benefits** emerge from the use of capital services by economic units and other ecosystems[2]. For instance, logs sold is a benefit that accrues to the commercial foresters and the consumer as the beneficiary. Natural capital provides biomass accumulation services in the form of trees which the forester is a beneficiary of. Human and produced capital are then used to harvest the trees and convert them to logs. Benefits are the result of other capital inputs (services) being combined with ecosystem services – there would be no logs to sell at market without human and produced capital as inputs to the harvesting of logs.

The following section takes the principles of the MCA and expands the description for each of the capitals – social, human, natural and produced.

[2] Generally, benefits to other ecosystems are not valued and or calculated, but it is important to recognise they do exist.

3 DEFINING THE CAPITALS[3]

Key features of the MCA are the stocks of capital and their condition and the flows of services and benefits that come from them. The greater the stock and condition of capital the greater the capacity to supply services and benefits. ICM recognises the spatial integration of investment in the capitals or the use of them to maximise multiple benefits.

The definitions of each capital are based on the TEEB Agrifood framework. Table 1 summarises the key measurement areas with detailed descriptions provided below.

Table 1. Key measuremnt areas for each capital

Capital	Unit	Extent unit	Condition measure	Services
Natural	Ecosystem	Area (ha)	Ecological characteristics	Provisioning, regulating, habitat
Human	Individual	Number (population)	Skills, education	Time in the form of labour input
Social	Multiple including household, sporting club, Landcare group, state or national government agency	Network size – area and number of people	Connectivity of the network	Distribution of knowledge via the network
Produced	Economic asset	Multiple including quantity (number of machines, km road, number of houses	Multiple, specific to the type of capital	Transport, warehousing, accommodation

3.1 Natural capital

Natural capital refers to "the limited stocks of physical and biological resources found on earth, and of the limited capacity of ecosystems to provide ecosystem services." (TEEB 2010, p.33) For measurement purposes it incorporates the "naturally occurring living and non-living components of the Earth, that in combination constitute the biophysical environment" (UN et al. 2014, p.134). It thus includes all mineral and energy resources, timber, fish and other biological resources, land and soil resources and all ecosystem types (forests, wetlands, agricultural areas, coastal and marine).

The natural capital unit for accounting and analysis is an ecosystem following the SEEA EEA. The stock of natural capital is the area of each ecosystem within a geographic area of interest, say a catchment. The condition of an ecosystem can be measured using ecological characteristics, for example vegetation type, density, coverage, etc. The services natural capital provides are commonly referred to as ecosystem services and include provisioning and regulating.

Expenditure on natural capital may consider the following:

- Expenditure on investment in natural capital aims to increase the area (extent) of (ecosystems) or improve the condition of the current stock. Investment activities may include native revegetation of non-native land, and condition activities include the removal of weeds and pests from existing (remnant) native vegetation.

[3] The capitals are defined following the UN SEEA and The Economics of Ecosystems and Biodiversity (TEEB) (2018). Measuring what matters in agriculture and food systems: a synthesis of the results and recommendations of TEEB for Agriculture and Food's Scientific and Economic Foundations report. Geneva: UN Environment. (Box 4.1, p. 48)

- If there is an increase in either the stock of natural capital or an increase in condition the return on investment is based on the change in ecosystem services and thus the benefits that are gained from the investment. An increase in hectares of a given natural capital is an output whereas the increase services (benefits) that result from the increase in stock are the used to calculate the return on investment.
- Expenditure is used to employ a capital may or may not have an impact on the stock or condition of the capital.

3.2 Social capital

Social capital encompasses "networks, including institutions, together with shared norms, values and understandings that facilitate cooperation within or among groups" (OECD 2007, p.103). Social capital may be reflected in both formal and informal arrangements and can be considered as the "glue" that binds individuals in communities. More broadly, it is the form of capital that "enables" the production and allocation of other forms of capital (UNU-IHDP and UNEP 2014).

Social capital is embodied in a household, business, not for profit or government. Fundamentally, social capital is a network that is maintained by an entity to provide networking services. It is the effectiveness of how well that entity employs and maintains the social capital that is measured for accounting and analytical purposes. The stock of social capital is the size of the network within a geographic area and the condition of that network can be measured by qualitative characteristics such as trust between network members or the speed in which information is transmitted across the network. Services provided by social capital include information sharing, coordination and or collaboration.

Expenditure on social capital may consider the following:

- Expenditure on investment in social capital will increase the extent of the network, i.e. engage more members over a greater area, thus the size or stock of the network is greater.
- Investing in access to knowledge (novel methods of land management) in the form of a technical report would be accounted for as the entity (say a Landcare group) purchasing produced capital in the form of a technical the report. The quality or condition of the social capital would be evaluated based on how many members (human capital) of the network have (or do) access to the knowledge over a given time period. Whether a member (human capital) employs the new method of land management is linked to social capital however, it should be noted that the social capital may be very effective but the human capital (the farmer) is low quality (poor education) and does not employ the new land management technique.
- Funding meetings of the network could be assessed based on the numbers that attend and the distribution of the members in a landscape.

3.3 Human capital

Human capital represents "the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being" (Healy and Côte 2001, p.18). Human capital will increase through growth in the number of people, improvements in their health, and improvements in their skills, experience and education. Income-based measurements of human capital usually need to be supplemented with quality indicators such as 'decent' working conditions (ILO 2008).

The stock of human capital is the number of people in a geographic area and the condition of those people (the stock) can be described using measures of education levels, skills, income, health etc. Services are in the form of labour provided to other economic units.

Human capital (individuals) contain or have knowledge embedded in them which they use to employ other capitals including natural and built capital to produce goods and services. They will also use this knowledge to look after themselves and contribute to social capital. The knowledge contained in human capital is also referred to as intellectual capital and is often embedded in produced capital in the form of technology, software, patents, brands, books and reports, etc. It is the capability of an individual to use and or employ that knowledge that is a measure of their condition.

Expenditure on human capital may consider the following:

- When funding the education of individuals what will the outcome be if they use that knowledge? Will it be an improvement in the condition of natural capital and thus an increase in the supply of ecosystem services?
- Investing in human capital can often contribute to social capital if the knowledge and or capacity provided to the human capital increases their ability to network more effectively and share their knowledge via the network.
- Investments in human capital can be described in terms of capacity building. A better educated person has the capacity to provide more and better labour services. For instance, they can better manage natural resources to produce ecosystem outcomes.

3.4 Produced capital

Produced capital refers to all man-made assets, such as buildings, factories, machinery, physical infrastructure (roads, water systems) as well as all financial assets. Human knowledge – sometimes called “intellectual capital” - is often embedded within produced capital (technology, software, patents, brands, books and reports, etc.).

The unit of analysis is the economic asset (house, machine, factory, truck, etc). The stock of the economic asset is a measure of the quantity of the asset and the condition of the asset is based on specific measures (characteristics) that are designed for each economic asset. Services are in the form of processing, accommodation, automation depending on the type of economic asset.

Expenditure on produced capital may consider the following:

- Will expenditure that is targeted at investment in produced capital impact the stock of economic assets?
- Is there sufficient human and social capital to employ the built capital that was invested in?

4 EVALUATING INVESTMENTS IN MULTIPLE CAPITALS

Investments by DELWP using the Integrated Catchment Management program aim to enhance and use natural, human, social and produced capital to achieve corporate outcomes, sustainable development objectives and deliver on policy commitments. There are three key criteria for evaluating investments in the ICM – OCOC goals, Environmental contribution levy objectives, and OCOC investment criteria.

The OCOC aims to deliver:

(i) Effective community engagement in catchment management
(ii) Better connections between state, regional and local planning
(iii) Strengthened implementation of Regional Catchment Strategies
(iv) Clearer roles, strengthened accountability and coordination
(v) Improved monitoring, evaluation and reporting

The environmental contribution objectives are also important for evaluating the investments:

(i) to promote the sustainable management of water; and
(ii) to address adverse water related environmental impacts

The Relevant OCOC Investment criteria include

(i) Environment benefits – multiple biophysical outcomes including water, land, biodiversity, coastal or marine benefits;
(ii) Social benefits – increased engagement and participation through collaboration and partnerships;
(iii) Economic benefits – a contribution to regional economic activity.

A key feature of the ICM-EF framework is the recognition of multiple capitals and their use as inputs to maximise environmental, economic and social outcomes. The ICM process involves making investments in the coordinated development and use of human, social and natural capital across a catchment. Changes in the capital base and the change in the flow of benefits that result, can be linked to the OCOC investment key criteria (see next section for more detail).

A program and policy may result in a decision to make an expenditure to address an issue. For the purposes of MCA and analysis of program and policy expenditures there are two aspects of, an investment in the stock or the use of a capital (see Figure 2 above). These include expenditure directed at investment focuses on changing the stock and or the condition of a capital, whereas expenditure directed at use is about the employment of existing capital stocks to provide services and benefits.

The employment or use of a capital assumes the capital exists and is in the condition required to deliver the services and benefits expected. Further, there is a direct link between investment and use. Past investments have increased the capacity to produce services both now and in the future. If a government were to expend funds only on the use of capitals, it is likely that through time the capacity of the capitals will diminish and in turn the government's ability to effectively deliver on policy and program commitments will also diminish.

Table 2 below shows the impacts of an investment in each of the capital stocks. From an ICM point of view the investment is further described as having both primary and secondary benefits. Primary benefits are the changes in capital that are created from the investment and secondary benefits are changes in other capitals that linked to or a direct result of the primary benefit. This differentiation of benefits is important because it recognises that for any given investment an integrated capitals analysis needs to be undertaken and there are often flow on effects to other capitals.

Table 2. Integrated capital accounting – investing in the stock of a capital[*]

	NATURAL CAPITAL	HUMAN CAPITAL	PRODUCED CAPITAL	SOCIAL CAPITAL
INVEST IN NATURAL CAPITAL >	**PB – More and improved natural capital**	SB – better health and wellbeing for people	SB – reduced produced capital inputs	SB – better health and wellbeing that supports social cohesion
INVEST IN HUMAN CAPITAL >	SB - better management of natural capital	**PB - Better education for people**	SB – produced capital is employed and used more effectively	SB - Individual capacity / capability contributes to social capital and networking
INVEST IN PRODUCED CAPITAL >	SB – the produced capital helps to conserve natural capital	SB – less time is required for people using the built capital	**PB - Better technology embedded in produced capital**	SB – networking (via computer) is easier to the social capital
INVEST IN SOCIAL CAPITAL >	SB – knowledge is transferred between human capital faster benefiting natural capital	SB – Human capital gains knowledge via networking faster and more efficiently	SB – produced capital is better utilised via shared knowhow between human capital	**PB – better social networking**

*) PB – Primary benefit, SB – Secondary benefit

The second expenditure effect is the use or employment of a capital, which does not necessarily have an impact on the stock (unless there is degradation from the use of the capital). This type of investment leverages on past investment in the stock of capitals. For instance, Landcare networks may have been funded in the past to ensure they are well networked (they have good geographic coverage and many of the landholders within the area are engaged). If government wishes to distribute knowledge or information to farmers, it can provide funding to the Landcare group to use their social capital to distribute the knowledge. Essentially, due to past investments by the government it is now possible to leverage returns from that investment by using the capital now.

5 ICM-EF IN PRACTICE

The ICM-EF can be used to analyse several different aspects of government expenditure. Based on the needs of different users the following areas can be examined using the framework:

Services and benefits – changes in services and benefits from an investment in a capital can be assessed. Changes in services and benefits may arise from as primary and or secondary benefits.

Capacity building – it is possible to use extent and condition information to estimate the capacity of each capital to provide services. This is quite useful as expenditure is often targeted at investing in capital (extent and/or condition) for capacity building purposes. In the past this type of investment have been recognised as being important but a systematic approach to analysing how capacity is changing (for any given capital) and impacting on key services has been lacking.

Sustainable development and thresholds – it is possible to use extent and condition information to estimate thresholds. A threshold is where the capacity of a capital is completed diminished and it can no longer provide services. From a sustainable development point of view this can be presented as a time series linking the use of a capital to changes in its capacity. For any given expenditure one could evaluate the return on invest as a change in capacity, avoidance of thresholds and presented on a

sustainable development (use) pathway. This information is important when considering which capital needs to be targeted to ensure sustainable development objectives are being met.

Productivity – the services and benefits provided can be estimated as a measure of productivity and in turn the contribution they are making to social and economic wellbeing. For instance, two capitals of the same type and quantity can be compared in terms of their relative output. The capital that has the greatest level of services is relatively more productive.

Cost effectiveness – at times it can be difficult to estimate the change in services and benefits that result from and investment and undertake a direct return on investment analysis. It may be understood that there is a relationship between a change in the extent or condition of a capital but quantifying the resultant change in services and benefits is challenging. So rather than try to estimate the services and benefits a cost effectiveness analysis can be undertaken. For instance, an improvement in the condition of an ecosystem (say a wetland) is understood to provide water filtration services, however it is difficult to quantify (reduction in tonnes of nitrogen) those services accurately. Instead, if there is confidence in the relationship between an improvement in condition and the provision of water filtration services, a cost effectiveness analysis can be done by looking at the ratio of expenditure to the change in condition. The lower the cost of a unit change in condition the greater the cost effectiveness.

5.1 Evaluating DELWP Output data using the ICM-EF framework

Another challenge to evaluating government expenditure in catchments is linking project (program) outputs to changes in services and benefits. The DELWP Output data standards are designed to support monitoring, evaluation and reporting and are also a key source of data to evaluate project performance that is linked to expenditure. In the following examples we will use the DELWP Output data standards as the entry point to do MCA using the ICM-EF.

Outputs are the good or service delivered through project investment. Generally, outputs are completed activities that are funded through agency programs. Each output represents a discrete item that contributes to the delivery of a broader project or program. Output data is numerical, textual and spatial information that describes the location and characteristics of the outputs linked to expenditure.

Management outcomes are the measurable changes directly attributable to implementation of a strategy or plan through delivery of projects and programs. Measurable changes may include physical change to the landscape, changes to land management, changes in community support or improvements to strategic planning. The management outcomes will be used as the entry point to undertake MCA using the ICM-EF. An overview of the links between the capitals and management outcomes is shown in Table 3. From the table it is clear that in many instances management outcomes can have an impact on several capitals and thus it is important to be able too systematically analyse these effects.

Table 3. Linking management outcomes to accounting for multiple capitals

Management Outcomes	Natural	Human	Social	Produced
1 Vegetation structure and diversity	✓			✓
2 Vegetation extent	✓			✓
3 Habitat available	✓			✓
4 Species control	✓	✓	✓	✓
5 Species recovery	✓	✓		
6 Water quality	✓			✓
7 Environmental water	✓		✓	✓
8 Soil stability	✓	✓		✓
9 Soil properties	✓	✓		✓
10 Extreme event preparedness		✓	✓	✓
11 Awareness		✓	✓	
12 Skills		✓	✓	
13 Collaboration		✓	✓	
14 Governance		✓	✓	
15 Amenity			✓	✓
16 Accessibility		✓	✓	✓
17 Productivity	✓	✓	✓	✓
18 Farm water		✓		✓
19 Groundwater		✓		✓
20 Cultural heritage	✓	✓	✓	✓

The following are examples of ICM-EF in practise using the DELWP standard outputs data and the entry point. Table 4 describes the use of the ICM-EF for fencing. The fencing output is 12.75 km that is protecting a riparian area next to a stream. Human capital and produced capital (materials) are employed to erect a fence, and the result is produced capital. The fence is the primary benefit in form of additional produced capital. Secondary benefits include an increase in the extent of natural capital and improvement in the condition of the natural capital because stock have been excluded. In a practical sense, the management outcomes can be used to help determine the primary and secondary benefits.

*Table 4. Linking fencing outputs and management outcomes using the ICM-EF**

Output	Output	Management outcomes	Capital type	Unit	Expenditure			Outcomes		
					Use	Investment		Environmental	Social	Economic
					Services	Asset extent	Asset condition			
			NC	Ha		ΔSB	ΔSB	Carbon sequestration Water services Habitat services	Recreation and amenity	Yield
			HC	People	Employed HC to establish fence					Employment
			SC	-						Leveraged funds
Fence	12.75 km	Water quality, amenity, habitat available, species recovery	PC	Fence (km)	Used fence to protect vegetation	ΔPB				

*) PB – primary benefits, SB – Secondary benefits

Changes in the stock of capital change the capacity of the underlying assets to provide services and benefits both now and into the future. The reason why investments are made is because they increase the services and benefits that flow to individuals. The next step is to think about how the use of capital and the changes in the capital base are linked to the DELWP outcomes:

(i) Environmental outcomes - the change in the extent and condition of the asset (riparian zone) provides more habitat services, carbon sequestration services and water services.

(ii) Social outcomes – the change in the extent and condition of the natural capital provides better opportunities for recreation, fishing and amenity benefits.

(iii) Economic outcomes – the change in natural capital changes the productivity of nearby land, increasing yield for farmers. Further, current social capital has been used to leverage in-kind contributions by using the existing farmer network. Finally, the use of human capital to erect the fences contributes to regional employment and economic activity.

With the development of this framing, a number of different performance measures can be used to evaluate the project. Return on investment is the change in water services or habitat services divided by the cost of implementing the project. Where information does not exist to calculate return on investment, there are a number of different performance measures that can be used to evaluate the outputs. Cost effectiveness can be used to determine the cost per unit of output (km of fence) or the cost per unit change in the capital base (area of riparian zone protected or the predicted change in condition of the zone). Metrics on leveraged funds or employment are input based measures that can also be calculated.

Table 4 below shows an example of an engagement event output that results in collaboration and skills management outcomes. The expenditure goes to employing the social capital – an existing network, say Landcare – to help people (human capital) to collaborate and increase their skill levels. Without previous investment in the social capital it would not be possible to employ it now, thus the government is leveraging past investments and employing them to deliver services now. In this cases there are two primary benefits, there is an improvement in the social capital since it now has embodied greater knowledge for immediate use and use later on, and there is an increase in the condition of the human capital because they have been educated in new methods for management native vegetation. Secondary benefits include improvements in the extent and condition of native vegetation because the better educated people are looking after the native vegetation better.

Table 5. Linking engagement events and management outcomes using the ICM-EF*

Output	Output	Management outcomes	Capital type	Unit	Expenditure			Outcomes		
					Use	Investment		Environmental	Social	Economic
					Services	Asset extent	Asset condition			
			NC	Ha		ΔSB	ΔSB	Carbon sequestration Water services Habitat services		
			HC	People	Employed human capital to advance partnership		ΔPB		Improved education	Employment
Engagement events	12	Collaboration, skills	SC	Existing network	Used existing social capital as network	ΔPB	ΔPB		Improved networking	Leveraged funds
			PC							

Once again, the next step is to think about how the use of capital and the changes in the capital base are linked to the DELWP outcomes:

(i) Environmental outcomes - the change in the extent and condition of the asset provides more habitat services, carbon sequestration services and water services.
(ii) Social outcomes – the change in the condition of the social capital provides better education of current and future members of the network.
(iii) Economic outcomes – Current social capital has been used to leverage in-kind contributions by using the existing farmer network and the use of human capital to manage native vegetation contributes to regional employment and economic activity.

5.2 Analysing investments in social capital and capacity building

It is often argued that investing in capacity building provides benefits to the community and the environment, however it is difficult to systematically analyse each investment in capacity building to determine the benefits. The example provided here focuses on Landcare groups but is equally application to Catchment Management Authorities, not for profits and other government agencies.

Landcare groups (and other like groups including CMAs) are legal entities that have been created to hold (be the custodian of) social capital on behalf of network members. Landcare uses, maintains and enhances social capital to deliver networking services which includes facilitating the dissemination of knowledge and innovations; and the promotion of cooperative and/or socially-minded behaviour. The networking effect of social capital reduces transaction costs and allows individual to benefit from access to knowledge and associated social spin-offs[4].

Landcare groups use the social capital to provide services to its members and to others. For instance, a state government may ask a Landcare group to use is social capital (networking functions) to disseminate information about weed and pest control. For the government this is a much lower cost approach than the government trying to disseminate the information itself.

Measures of connectedness (the strength of the network) of individuals (human capital) reflects the extent and condition of social capital. Member numbers and area of coverage could be used as proxies to measure the extent (or size) of the social capital. The degree to which it is in good condition and functioning well could be estimated by the number of meetings and the percentage of members that attend meetings over a given time frame (accounting period), say a year. The service the social capital is providing is the distribution of knowledge via the network effect of the social capital, reducing transaction costs or fostering cooperation that is mutually beneficial to entities within the network.

Through networking effects and the distribution of knowledge the social capital “enables” the production and allocation of other forms of capital. For instance, a Landcare network may gain access to knowledge on how to best manage a weeds and pests, and through the network distribute this knowledge to farmers (human capital). This may improve the farmers human capital if they decide to invest time in understanding the information. This enables farmers to improve natural capital (removing weeds and pests) and employs human and produced capital to undertake the works. Another example tied more directly to the employment of capital could be soil management practices that reduce runoff and erosion. The knowledge on how to better manage soils is distributed by the social capital using its network of farmers.

[4] Social Capital: Reviewing the Concept and its Policy Implications (2003), Commission Research Paper, Productivity Commission, Australia

The existence of networking effects by using social capital gives human capital access to knowledge. However, it does not imply that all members of a network have the same level of knowledge, but it does mean that high performing networks allow all members to readily access knowledge and are aware of the type of knowledge this is available.

6 CONCLUDING COMMENTS

Integrated Catchment Management (ICM) is the coordinated planning and management of land, water, biodiversity, coasts and marine environments. Using on ground works, social networks, partnerships and collaboration, ICM helps to deliver environmental, economic, and social (cultural) benefits to local communities based on their values and priorities.

The ICM – Evaluation Framework (ICM-EF) is a multiple capital accounting (MCA) approach to monitoring, evaluation and reporting that links government expenditure to environmental, economic and social outcomes. The ICM-EF is modelled on the United Nations System of Environmental-Economic Accounting framework (SEEA 2012) and the TEEB AgriFood Evaluation Framework (2018). The framework captures how government expenditure effects stocks of human, social, produced and natural capital. The framework means that outcomes generated by government programs and policies can be objectively evaluated against the aims of different policies and strategies.

The framework provides a fully integrated, coherent and consistent treatment of expenditure for each capital. The framework is designed to capture how the relationship between expenditure and sustainable development varies across time and space, enabling place-based policy that is underpinned by objective evidence.

Deployment of the ICM-EF framework should be accompanied by the collection of project specific data . Given that the data collected is spatially explicit and organised according to stocks and flows, the framework can be used by the Victorian Government as an coordinating mechanism for future investment across and within catchments.

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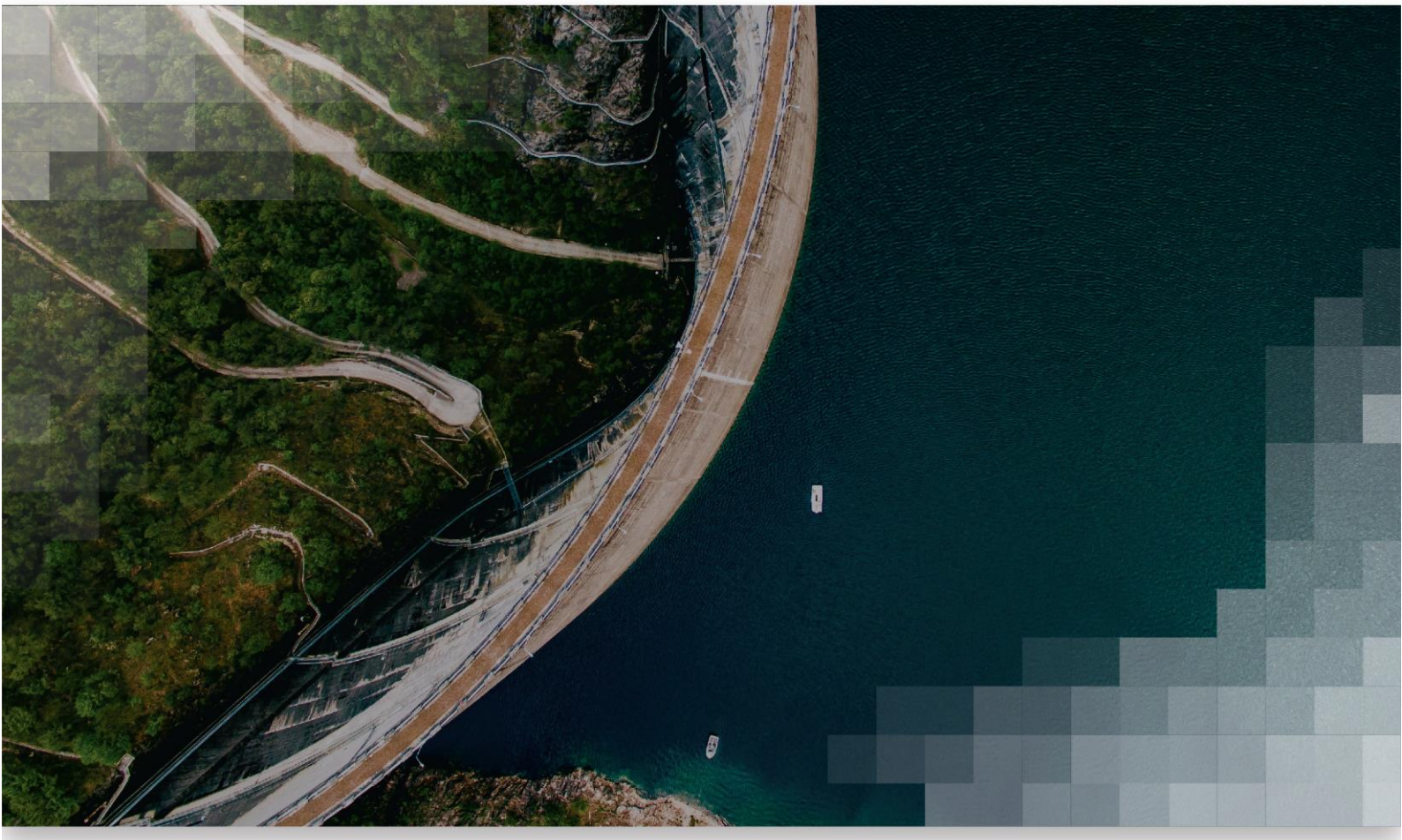

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