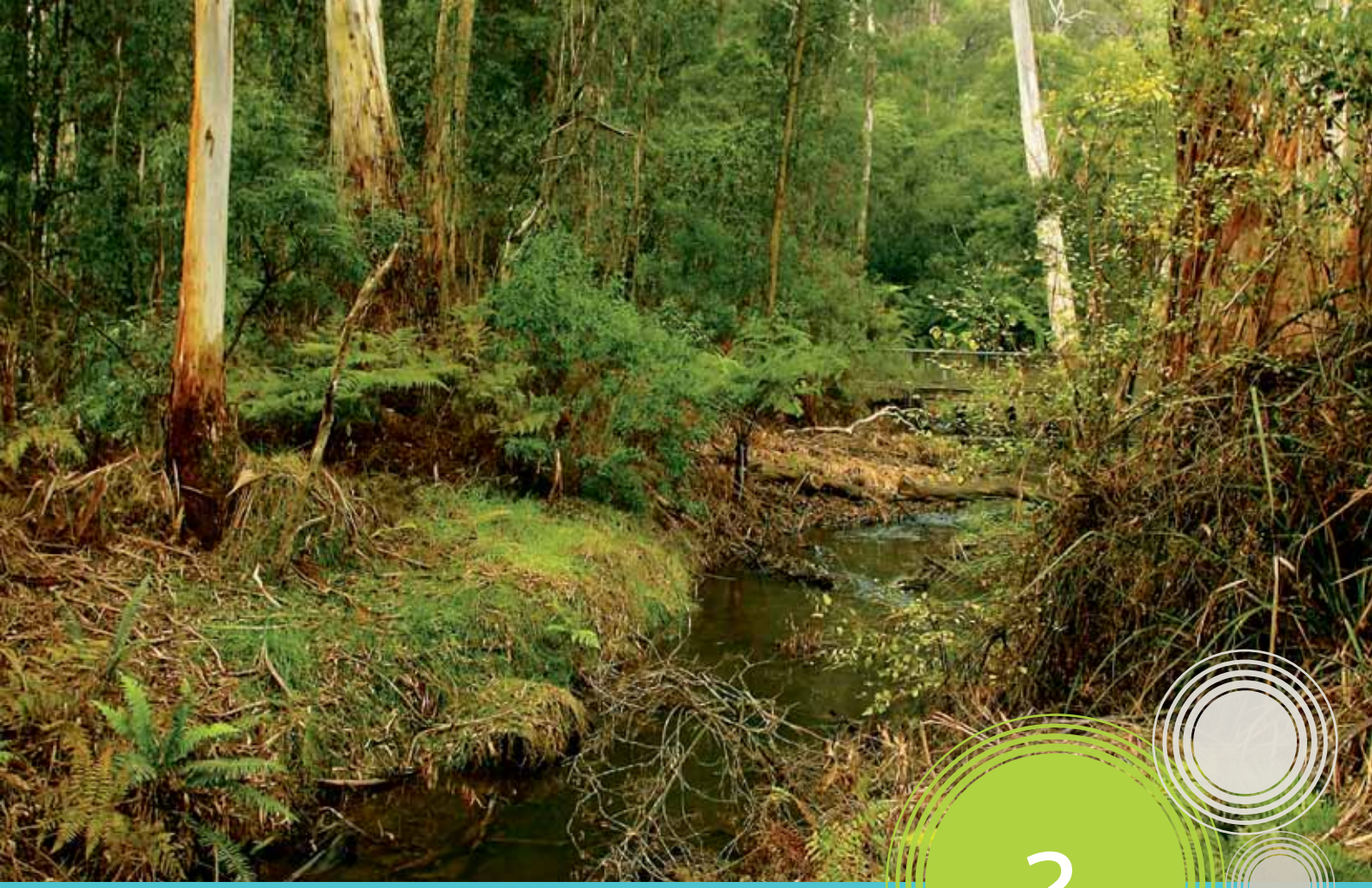


2

Strategy development

This chapter describes the process Melbourne Water used to develop the *Healthy Waterways Strategy* in partnership with our customers and stakeholders during 2011 and 2012. More detailed information on the development of the strategy is available in the *Healthy Waterways Strategy Resource Document*, which is available on Melbourne Water's website.

2.1 Strategy context

Waterways across the Port Phillip and Westernport region are valued and used by the community in many ways and for many reasons. The *Healthy Waterways Strategy* is based on the principle that waterways will be managed to a level that enables them to support the community values that are appropriate at that site. In some cases, this will mean protecting and maintaining near natural waterways; in others, it will mean improving or maintaining modified waterways to an appropriate level. Not all waterways can support all values, and some waterways will remain in better condition than others in the short and long term.

The development of the *Healthy Waterways Strategy* has been guided by:

- Community, customer and stakeholder expectations and needs for waterway management
- The need to work in partnership with others to establish our goals for waterway health
- Valuable community knowledge of waterways in the region
- The best available scientific research to underpin our decision making and actions
- Consultation on the draft *Healthy Waterways Strategy* and incorporation of community feedback into the *Healthy Waterways Strategy*.

Building on the strengths of previous river health strategies

The *Healthy Waterways Strategy* has been developed using a similar approach to the *2005 Regional River Health Strategy* (RRHS) – both take an asset-based approach to waterway management, and are based on the principle of 'protect the best'.

The HWS incorporates estuaries and wetlands along with rivers to ensure more holistic management of waterway health.

Focusing on what the community values

Through the implementation of the RRHS, we have increased our understanding of the importance of waterway values to the community. In response, the HWS moves beyond focusing on traditional measures of waterway condition – flow, vegetation, water quality, bank stability and macroinvertebrates – to 'key values' that waterways support: fish, frogs, platypus, birds, macroinvertebrates, vegetation and amenity. These key values provide the framework for targets and outcomes in the HWS.

This shift in approach more closely aligns the HWS with community expectations and aspirations for waterways. It will also deliver more efficient and effective on-ground works by targeting effort where it is needed most. This new target framework and approach has not greatly altered the type of works proposed in the strategy, but it has helped us prioritise where we undertake these works to maximise their benefit.

Considering value condition alongside waterway condition

Significant investment over the past 10 years into waterway health in the Port Phillip and Westernport region has resulted in many visible improvements including a reduction in weeds, more native plants, and improved stabilisation of waterways. However, despite large-scale investment in river health, the condition of certain values that those waterways support declined, such as platypus in the Dandenong catchment.

The reasons for this decline are likely to include the impacts of drought, predation by dogs and foxes and ongoing pressure of urbanisation. By monitoring and understanding key value condition, as well as waterway condition, we can ensure management actions protect and improve those aspects of waterway condition that are most critical for the values.

Ensuring effective investment

Monitoring and research have increased our understanding of the responses of waterways and waterway values to management interventions and the cost-benefit and affordability of those interventions. In the HWS, targets have been developed to reflect community values and what is achievable given finite resources.

In the HWS, we aim to invest public funds effectively by targeting actions to support the key values, and efficiently by taking an integrated approach. We are assessing the health, condition, trends and threats to key values and planning actions to address flows, water quality, vegetation and stream bed and bank structure and connectivity together.

2.2 Strategy development process

The phases of work undertaken to develop the strategy and the main activities and outcomes from each are summarised in Figure 2.1. This section provides an overview of the strategy development process. A more detailed description is available in the *Healthy Waterways Strategy Resource Document*.

Review and evaluation of past approaches and strategies

In the review phase, Melbourne Water considered the outcomes of several evaluation processes including the state review of the Victorian River Health Strategy and regional river health strategies; review of the *draft Port Phillip and Westernport Regional River Health Strategy* and *Addendum* target framework, long-term aim and achievements; and review of changes in waterway management delivery.

Strategy approach

The approach for developing the HWS was prepared that incorporated outcomes from the review process. Key elements of the approach are:

- Expanding the asset base of the strategy to include wetlands and estuaries (see Box 1.1: Defining waterways) so that waterways are managed holistically
- Defining a spatial scale for the strategy that enables upstream and downstream impacts to be considered through a systemic approach to waterway management (see Section 2.4: Target Framework)
- Engaging with the community, customers and stakeholders to understand and incorporate their values and aspirations (see Section 2.5: Consultation on the strategy)
- Adopting key values as the basis of the target framework to make the strategy more meaningful to the community and better reflect the long-term aim (see Section 2.2: Strategy Development Process – Identifying key values)
- Targeting works to achieve the most effective outcome for key values based on a 'trajectories' approach (see Box 2.1: The trajectories approach – managing for resilience) while continuing to invest across the region to maintain system health and long-term potential where possible
- Developing and implementing the HWS within an adaptive management framework that enables us to incorporate and act on new science as it becomes available (see Box 2.3: Adaptive management)

> Developing a separate but complementary *Stormwater Strategy* to consider the impacts of urban and rural runoff, and incorporate additional drivers for stormwater management – wellbeing and amenity, public safety, alternative water supply (see Section 4.8: Stormwater management).

The approach is grounded in our understanding of the relationships between management actions, waterway condition and the values that waterways support, as represented in Figure 2.2. For example, management actions such as establishing streamside vegetation have positive impacts for water quality, which increases the health of macroinvertebrate populations. These relationships underpin our management approaches and help to target investment.

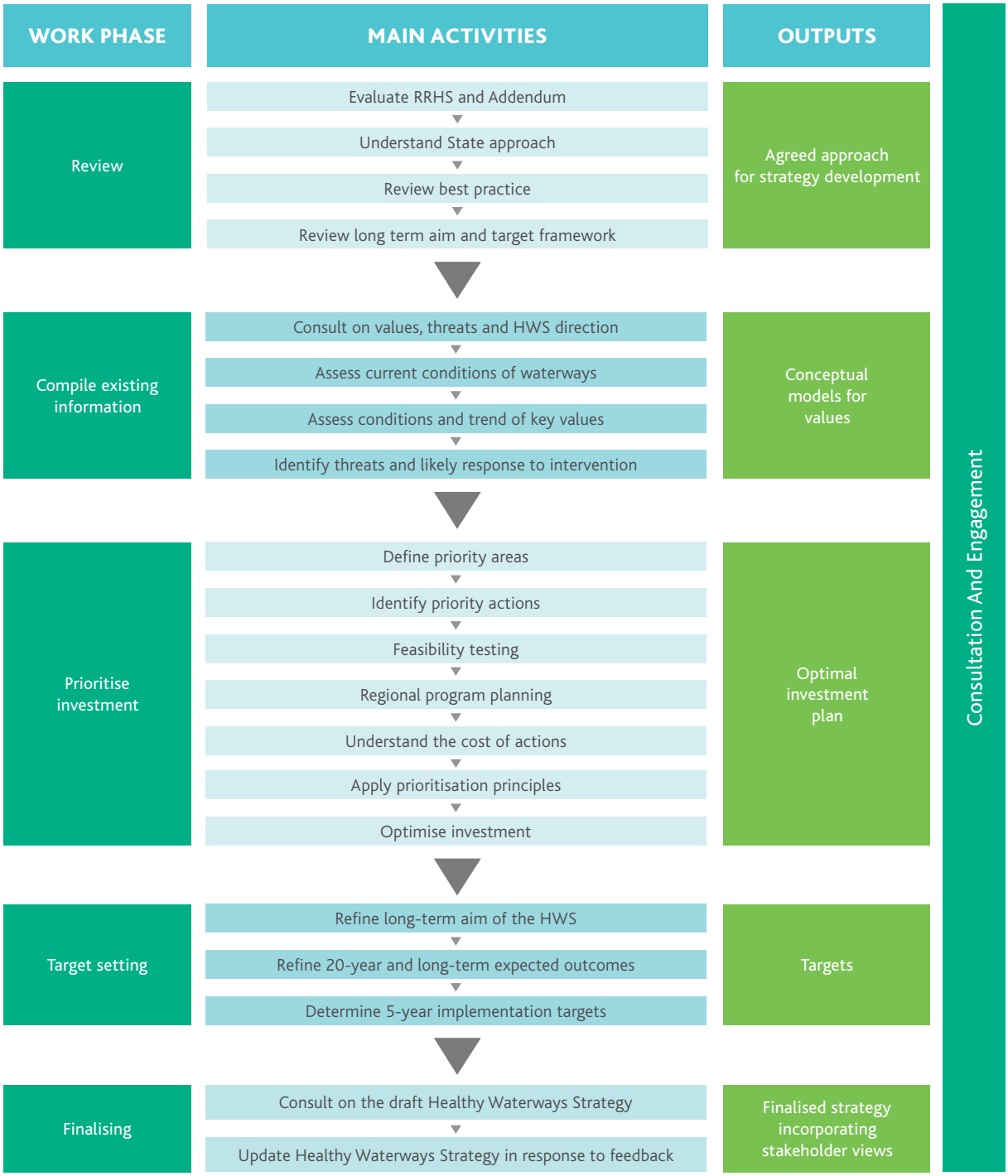


Figure 2.1: Healthy Waterways Strategy development process

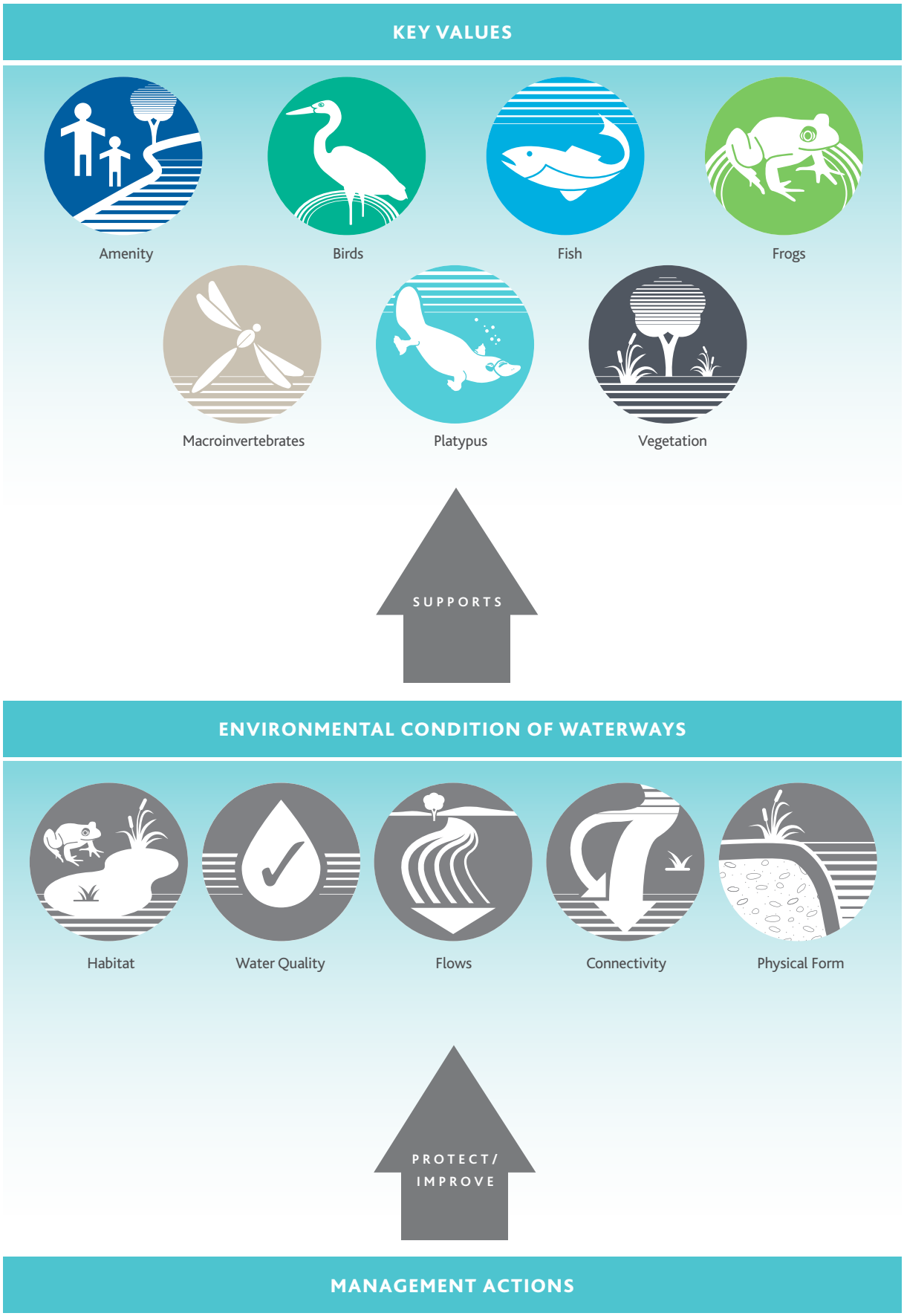


Figure 2.2: Relationship between management actions, environmental condition of waterways and values

BOX 2.1

The trajectories approach – managing for resilience

Melbourne Water used a 'trajectories' approach to determine the actions required to put our waterways and values on a path to improvement for the *Healthy Waterways Strategy*.

This approach aims to identify management actions most likely to deliver improvement in the key values, and increase our ability to efficiently and effectively prioritise investment. The trajectories approach is a practical application of how 'resilience thinking' can be used in waterway management – forecasting the future condition of values based on understanding the impacts of past events, current condition and trend.

Waterway resilience is important in coping with pressures such as climate variability, extreme events such as fires or floods, and human pressures. The HWS defines resilience as the ability of the ecosystem to recover from damage without losing its fundamental structure and function. The more resilient the ecosystem, the bigger the shock it is able to withstand. Because ecosystems are dynamic, resilience is not about a single ideal ecological state, but an ever-changing system of disturbance and recovery.

Resilience of waterways and their supported biodiversity is an important consideration in investment decisions. The *Healthy Waterways Strategy* focuses our investment on protecting waterway areas in the best condition or with the potential to support healthy and resilient populations of key environmental values.

The trajectories approach involves forecasting the future condition of each of the values based on an understanding of catchment history, waterway condition, current condition and trend of key values, threats to values, thresholds and likely response of key values to management actions. That is, using all available information to understand if value condition is declining, stable or increasing and predict what impact management actions will have on this trajectory. This is a risk assessment process that identifies the key limiting factors for values and most effective management actions to mitigate those risks. A wide range of monitoring/research data, published studies, literature review and expert opinion was used throughout the process.

Fundamental to the trajectories approach is an assessment of waterway condition within a framework that considers riverine and floodplain quality and connectivity and the development of a conceptual model for each key value. A conceptual model is simply a way of documenting our understanding about a particular set of relationships (see Box 2.2: Conceptual models).

This approach builds on the traditional asset-based risk assessment in the RRHS. More information on the approach is available in the *Healthy Waterways Strategy Resource Document*.

BOX 2.2

Conceptual models

Conceptual models – also referred to as logic models or logic trains – are used to describe how an action is known (or assumed) to produce a particular response. Conceptual models are a way of documenting and communicating our understanding of a particular set of relationships – for example, the impact of providing streamside vegetation on water temperatures, and the consequence on fish populations. A conceptual model can be a simple table of information or a complex diagram.

In the *Healthy Waterways Strategy,* conceptual models have been used to document what we know, or assume, about the relationships between:

- waterway and value condition;
- threats to condition;
- management actions we undertake;
- the response we see in the waterways; and
- the responses in value condition.

The trajectories approach (see Box 2.1) identified key elements of these relationships. The conceptual models have been summarised for each waterway value in Chapter 3. These models allow us to identify the actions most likely to improve the values. Our knowledge about the relationships between management actions and waterway health outcomes is incomplete in many areas. For some relationships, scientific studies may demonstrate a clear link between an action and an outcome, providing high confidence in the relationship between that action and outcome. However, there are few or no scientific studies for other relationships, and we rely on assumptions or expert opinion to determine the link between an action and an outcome, providing a lower confidence in the relationship.

The level of confidence has been assessed for each relationship in the development of the conceptual models. Through adaptive management, low confidence relationships will be prioritised for investigation to test our assumptions and improve our knowledge, and the conceptual models will be updated. For more information on the development of conceptual models, see the *Healthy Waterways Strategy Resource Document*.

BOX 2.3

Adaptive management

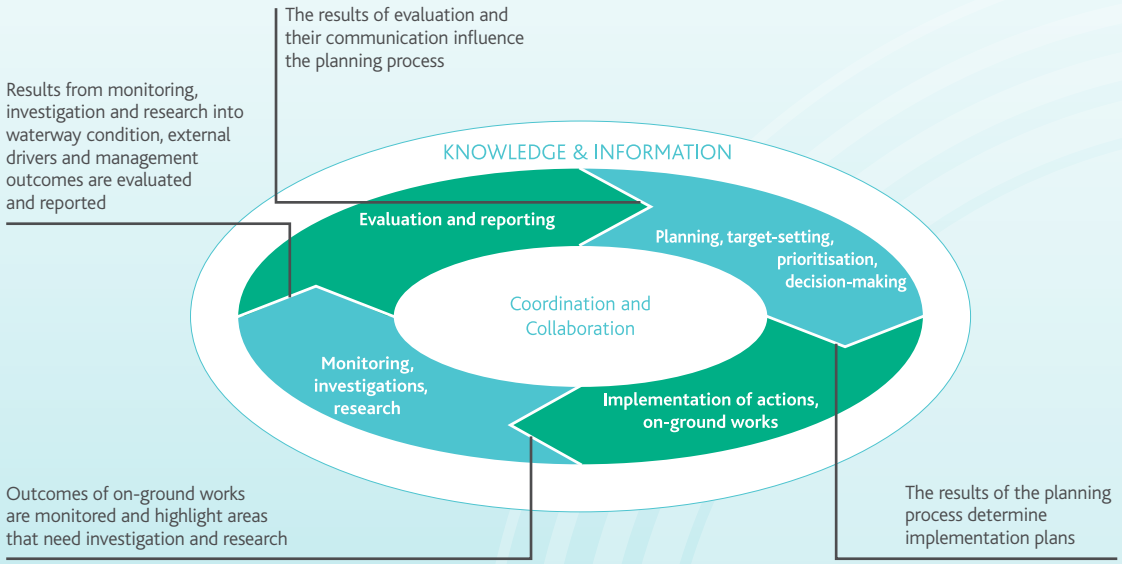


Figure 2.3: Melbourne Water's adaptive management cycle

Adaptive management is a systematic process for improving management effectiveness by 'learning from doing'. Effective monitoring, reporting, evaluation and strategic research are key elements of this adaptive management cycle. The *Healthy Waterways Strategy* has been developed based on the best available scientific information and local knowledge. During the life of the strategy, it will be important to keep monitoring the condition of key values, the state of the environment and the effectiveness of our management activities to continue learning new information. The knowledge gained will provide the basis for continuing with, or adapting, our actions in response to what has been learned, and to ensure we are making the most efficient and effective investment decisions.

Further information on how we use adaptive management can be found in Chapter 6: Adaptive management: monitoring, investigations, research and reporting.

Identifying key values

Key values are the basis of our target framework. They reflect community aspirations for waterways and ensure the management actions undertaken link directly to our desired outcomes. Key values are amenity, birds, fish, frogs, macroinvertebrates (water bugs), platypus and vegetation. The values were selected based on their importance to the community, data availability to assess condition, and ability to appropriately represent the range of values found in rivers, estuaries and wetlands.

All other waterway values outside the HWS target framework are termed influencing values. The downstream receiving waters of Port Phillip Bay and Western Port have also been considered as values, and directions for reducing water quality impacts on these values are incorporated in the *Stormwater Strategy*.

Although these key values are central to the strategy as a means for setting long-term aims and measuring progress, they are just one part of our waterways management model and must be considered alongside environmental condition as outlined in Figure 2.2. Key values are important because they represent the reasons for maintaining waterway condition and provide an indication of the overall health and quality of our aquatic environments. The *Healthy Waterways Strategy* aims to achieve healthy waterways that provide the conditions needed for them to function and support both key and influencing values.

The identification of priority areas for investment and the target-setting framework centre on the key values, however influencing values will be considered in implementing the strategy to maximise the benefits from undertaking activities. Most works undertaken to benefit one value will also benefit other values. For example, establishing vegetation to improve bird habitat will have benefits for other key values as well as influencing values such as water quality. Influencing values are in no way less important to the community and to waterways, but are primarily managed through other strategies and mechanisms. See the *Healthy Waterways Strategy Resource Document* for further details on the role of influencing values.

2.3 Optimising investment

With an expanded asset base compared with the previous *Regional River Health Strategy* – now including estuaries and wetlands, as well as rivers and creeks – a robust priority-setting process is even more important to ensure efficient and effective outcomes from the investment of public funds.

An understanding of the urgency and most effective management actions for each value (via the conceptual models), identification of priority areas for each value, and results of a feasibility and cost-benefit assessment were considered alongside the vision, and an investment program was developed that balances the waterway health needs of the region.

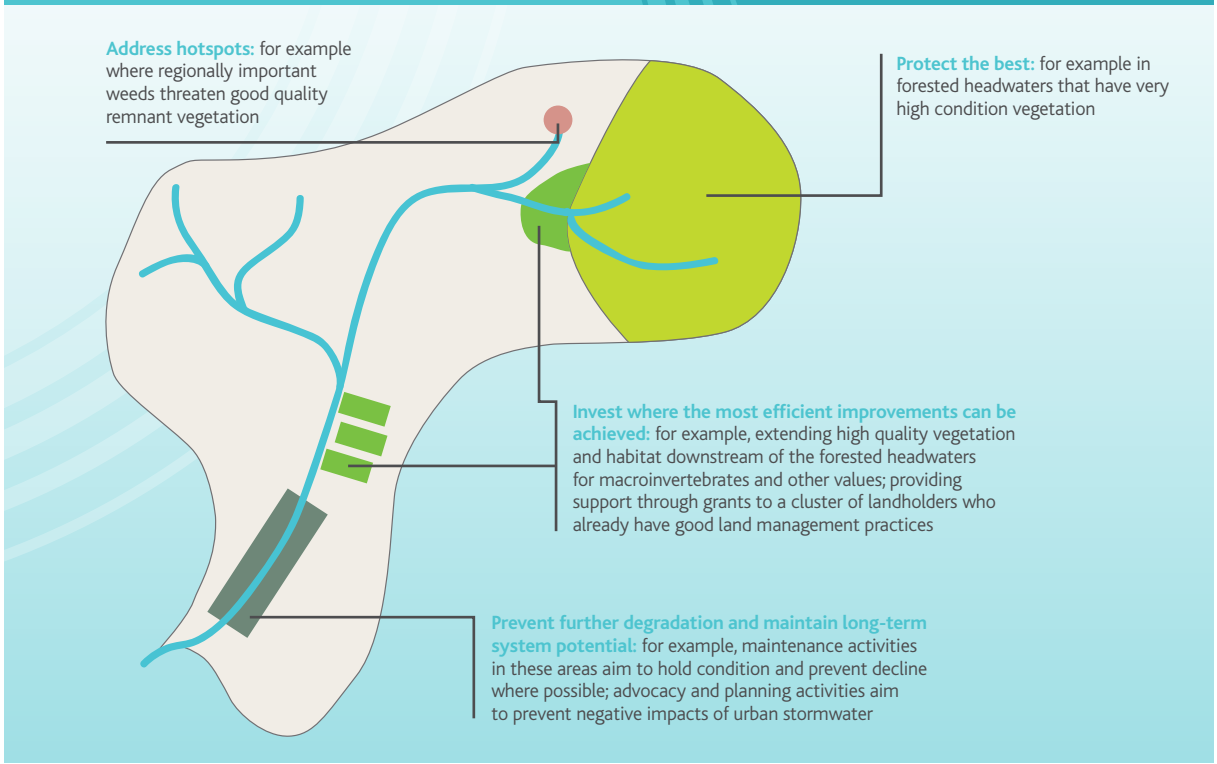
The following principles were used to prioritise investment:

- Protect the best first
- Invest where the most efficient improvements can be achieved
- Prevent further degradation and maintain system health and long-term potential where possible
- Address 'hotspots' – where current conditions are unacceptable due to acute risks to public health, safety or waterway values.

Box 2.4 provides examples of these principles in practice. The outcome is the proposed program of actions and targets outlined in Chapters 4 and 5.

BOX 2.4

What do these investment principles mean in practice?



Identifying priority areas

Priority areas are the most important for each key value across the Port Phillip and Westernport region. They are areas where implementing appropriate management actions over the life of the strategy to protect and improve waterway condition will have the greatest benefit to the key values, thereby progressing towards achieving our vision for waterways.

Priority areas were identified for the seven key values in consultation with scientists and environmental specialists by using data to identify where values are in good condition or have the best potential to be improved (see *Healthy Waterways Strategy Resource Document* – Optimising investment).

Figure 2.4 shows the priority areas for Melbourne Water to invest in on-ground works, including vegetation establishment and management, improving fish passage and habitat for 2013/14–2017/18 (see Chapter 5).

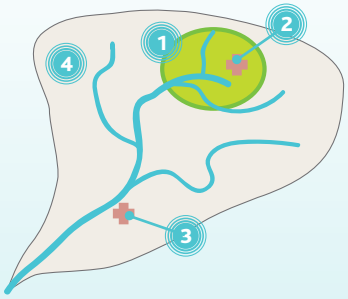
Figure 2.3: Priority areas for on-ground works for 2013/14–2017/18

Investment outside priority areas

Specific actions are required in priority areas to ensure outcomes for key values are achieved, but investment also occurs outside priority areas across the Port Phillip and Westernport region to maintain system health and long-term potential where possible. We will continue to work with the community to maintain and build stewardship and address local priorities across the region.

Some actions are best planned for regionally, so not all actions have been planned at priority area scale. For example, programs for enforcement and building stewardship were considered regionally.

BOX 2.5
What do the priority areas mean in practice?



What do Priority Areas mean for key values? – a frog priority area example 1

Priority areas are the most important areas for protection of the key values (waterway values most important to the community) across the region. Based on current knowledge and data, this priority area is one of the most important areas in the region to improve waterway condition to support frogs. It was identified by following the HWS principles and applying the additional principles for frogs of prioritising:

- areas of high species richness
- large areas of complex wetland over small non-complex wetlands
- wetlands connected to other vegetated areas over isolated systems

Management actions will be targeted here over the life of the strategy and will specifically consider how to improve waterway condition to continue to support frogs. For example, when doing revegetation work the needs of frogs will influence the species and design of revegetation. Works done in this area will also benefit other key and influencing values, for example, birds and water quality.

What about influencing values?

The term "influencing values" applies to all waterways values outside the *Healthy Waterways Strategy* target setting framework. Influencing values are in no way less important to the community and to waterways, but are managed mainly through other strategies and mechanisms for example water quality or threatened species. Influencing values will also be considered in implementing the strategy to maximise the benefits that can be derived.

Influencing values in priority areas – a threatened species example 2

The known presence of threatened species such as growling grass frogs in this area means particular care will be taken to provide the right conditions for growling grass frogs when undertaking works.

Influencing values in the rest of the catchment 3

In the case of threatened species, which are protected through legislation, Melbourne Water has a responsibility not to negatively impact them through our works. Melbourne Water will contribute to threatened species management through monitoring and research, management of biodiversity on land that we own and supporting the work of others.

Programs for the entire catchment 4

Across the entire catchment:

- Melbourne Water will support landholders, community groups and public land managers to address local priorities through the incentives program (subject to program criteria being met).
- Maintenance will occur as per the asset management framework.
- Asset protection and renewal will be undertaken where priorities are identified through a risk assessment process.
- Melbourne Water will participate in planning processes and advocate and enforce for protection of all waterway values where appropriate and
- Environmental flows will be improved where applicable.

2.4 Target framework

The *Healthy Waterways Strategy* target framework has the following components:

VISION

Healthy and valued waterways are integrated with the broader landscape and enhance life and liveability.

They:

> Connect diverse and thriving communities of native plants and animals.

> Provide amenity to urban and rural areas and engage communities with their environment.

> Are managed sustainably to balance environmental, economic and social values.

This vision represents a collective community aim for waterways, and paints the picture of what our waterways will look like if we are successful. It represents the desired health of waterways in the future, balancing community aspirations, the viability of populations and affordability over 100 years.

20-year goal

By 2033 the condition of waterways enables significant improvement in the health of environmental values and amenity in waterways.

The 20-year timeframe relates to the time taken to see measurable change across waterways and key values. This goal represents a milestone against which the outcomes of our efforts can be compared as we progress towards the long-term aim. The 20-year goal is expressed for each system as the 20-year expected outcome for each value (see Chapter 5).

5-year implementation targets

Implementation targets summarise the management actions to be delivered over the next five years. They provide a means of measuring progress in the shorter term.

The expected outcomes and implementation targets are presented for each management approach in Chapter 4 and for each value and system in Chapter 5.

Setting expected outcomes for values

Expected outcomes are the condition rating we expect to see for each key value community/population in each system within the specified timeframe (20-year expected outcomes and long term expected outcomes).

Using our understanding of the current condition and trend of values as the starting point, the 20-year expected outcomes for key values is established from an assessment of desired and achievable future condition assuming an extrapolation of proposed *Healthy Waterways Strategy* investment and approaches over the 20 years. The investment and approaches are represented by the 20-year strategic priorities for each system and use conceptual models for the values to understand the impacts over that time.

Over the next 20 years, we will continue to measure the condition of key values using metrics such as those described in Chapter 3 and the *Healthy Waterways Strategy Resource Document*. Mid-term reporting on the value condition will occur in 2023. The report will be developed based on the conceptual models and implementation targets and compared to actual condition via the key value metrics.

Spatial scale

In order to set expected outcomes and consider management approaches at an appropriate and relevant spatial scale, 14 geographical areas known as 'systems' were identified in the Port Phillip and Westernport region. Systems have been selected to follow the natural catchment boundaries to ensure hydrological connection and also to reflect species distribution. The availability of data and the ability of management actions to influence targets in the short and long term were also considered in determining the spatial scale of the systems. Implementation targets and expected outcomes for key values are set at the system scale however, management units, as described in the RRHS and Addendum, are still a useful spatial tool for describing waterway and key value condition and are used for this purpose in Chapter 5.

What do expected outcomes mean locally?

The systems provide an average view of the changes occurring in key value communities within an area. So we may see the health of the bird community improve in the Dandenong system over 20 years, but we may not see improvements at all individual locations. The systems are a necessary compromise between the desire to understand and plan for key value condition at the local waterway scale and being able to accurately represent a baseline condition score and observe change over time from the monitoring data available.

The same condition rating (e.g. high, low) for key values will look different between systems. For example, annual rainfall, topography and underlying geology of the Werribee and Little River Middle and Upper system is very different to that of the Upper Yarra system. Because of these differences, we expect the vegetation to look very different between these areas, even though both systems have vegetation considered to be of high quality. Similarly, there will be a difference in fish species present in the Upper Maribyrnong system compared to the Cherry, Kororoit, Laverton, Skeleton system, although both fish communities are in moderate condition.

Why a 20-year expected outcome?

A 20-year outcome is a meaningful timescale to observe change given the time the natural environment takes to respond to changes. Depending on the action and scale at which it is undertaken, it can take from 12 months to see the impacts of the installation of a fishway to 25–50 years for the full environmental benefit of re-establishing vegetation along waterways. Timeframes for response will also vary across the Port Phillip and Westernport region based on local characteristics – for example, with lower rainfall in the west of the region, vegetation growth is slower than in the northern and south eastern areas. For most key values, 20 years is a realistic timeframe to see a change in response to our work reflected in their condition.

Setting implementation targets

The implementation targets express the work that Melbourne Water commits to do with our partners over the life of the *Healthy Waterways Strategy*. They represent the most effective and efficient investment to progress towards the long-term outcomes. As well as being guided by the long-term expected outcomes within each system, the implementation targets are guided at the priority area scale by specific management objectives. They are also guided by an assessment of how much of each activity is feasible within each system.

BOX 2.6

Melbourne Water Urban Platypus Program – adaptive management in action

Adaptive management involves taking lessons learned from the success or failure of previous or ongoing management actions and using this knowledge to inform the next management stage. It is impossible to know everything about a system, species or process before formulating an action plan to protect or improve it, so it is important to be able to incorporate new information as it arises and adjust works accordingly.

Since 1995, the Melbourne Water Urban Platypus Program has been monitoring platypus distribution and abundance within the Port Phillip and Westernport region and studying platypus biology, ecology and behaviour. This program allows us to track the health of platypus populations and more effectively target management actions to protect this iconic species.

Following continued drought between 1997 and 2006, data from these surveys identified significant declines in platypus numbers across Melbourne's catchments. This led to a five year platypus capture and tagging program beginning in 2007 to more systematically investigate the response of Melbourne's platypus to the prolonged drought.

This study incorporates twice-yearly monitoring at core sites as well as the flexibility to investigate new sites in response to platypus sightings, or in response to localised threats, such as the Black Saturday bushfires in February 2009. New investigation methods, such as acoustic tracking have also been used to help clarify individual home ranges and habitat preference.

Results showed continued decline in platypus numbers over the last three years of the drought, but following extensive flooding in February 2011, platypus numbers improved. Population decline seems to have been halted in some areas, with modest increases in other locations, though it is still too early to draw reliable conclusions.

These investigations have also shown us the importance of areas such as the main stem of the Yarra, Lilydale Lake and wetlands next to high quality waterways, as refuge and foraging areas. Also, platypus populations in waterways with intact streamside vegetation seem to be less affected by flooding.

*Urban platypus survey (Photo courtesy of **Edward Tsyrlin**)*

2.5 Consultation on the strategy

Melbourne Water engaged individuals and organisations across the Port Phillip and Westernport region in the development of the strategy. We aimed to build on the extensive engagement and knowledge building that was part of developing the RRHS.

The *Healthy Waterways Strategy* consultation included engagement with landholders, indigenous groups, government agency representatives, waterway health experts, community groups and the general community. Consultation was run in two phases:

- Input on values, threats and potential solutions to waterway health issues to inform the development of the draft *Healthy Waterways Strategy,* including:
  - 12 workshops with 280 participants in March/April 2011
  - online forum where the community, customers and stakeholders could provide comments and be actively involved
  - numerous individual meetings with stakeholders.
- Feedback on the draft strategy, in particular on the vision, the expected outcomes and how Melbourne Water can better work with stakeholders to deliver the strategy, including:
  - eight workshops with 410 participants in May/June 2012
  - online forum where the community, customers and stakeholders could provide comments and be actively involved
  - numerous individual meetings with stakeholders
  - more than 60 submissions received in response to invitation to provide written feedback.

Consultation with community in Wyndham, 2011

The two phases of consultation helped shape the process and outcomes in several ways.

Feedback from the workshops and online forum in March/April 2011 was used to:

- Confirm the selection of key values – the proposed key values were identified through community consultation undertaken as part of the RRHS and Addendum and social research findings. Feedback confirmed that the proposed values reflect what the community values about waterways. More than 60% of values identified through consultation related directly to key values, while other values identified included recreation, heritage, coastal and marine values and habitat for native animals. These other values are managed through other strategies or processes.
- Provide direction regarding management approaches, in particular, the need to clarify and improve management approaches regarding advocacy and enforcement.
- Provide direction on the layout and structure of the strategy, particularly the need to present information regarding individual catchment objectives and targets as standalone sections.

Additionally, feedback on the location of values across the catchment was consistent with the identified regional priority areas for key values, which were selected through data analysis and in consultation with environmental experts. More than 70% of the areas identified as important by the community are within regional priority areas, demonstrating a strong correlation between community values and key values. Not all local priorities are captured within the regional priority areas and Melbourne Water will work with communities to support local priorities where appropriate. Feedback received during consultation will help to direct where work with grants and maintenance programs will take place during implementation of the strategy.

Consultation with community in Warburton, 2011

Feedback from the workshops and online forum in phase two in May/June 2012 was used to:

- Confirm that the intent of the vision represented the community's aspirations for waterways and update the wording to ensure it reflects those aspirations.
- Ensure that the expected outcomes for key values represent an appropriate level of service given community aspirations and environmental constraints.
- Improve the way information in the strategy is presented to increase clarity.
- Seek direction on how to better engage and work with our stakeholders in implementing the strategy.

Consultation and engagement is an important part of developing and delivering the *Healthy Waterways Strategy*