

3 Making Visions Real

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3.1 Introduction

Water and the drainage network are natural assets and important features in the landscape. Careful planning is required to develop visions that restore, protect, and manage surface water resources. The planning process shown in Table 3-1 and described in this chapter may be applied to land or waterbodies generally, irrespective of area or size.

Restoration, protection, and management are sometimes voluntary activities carried out by the Council, landowners, or the community. At other times they may be part of a statutory plan provision, or a legal requirement to mitigate the adverse effects of land development or use.

Scenarios may include:

- private property adjacent to waterways or wetlands
- a large subdivision in an urban growth area ('greenfield' developments) which may require formation of esplanade strips / reserves or on-site stormwater management
- redevelopment of an existing site
- infill development or the extension of a house into a waterway setback zone
- public reserves that include waterways or wetlands
- a wetland or waterway on a rural farm block.



Waterway and Wetland Restoration Process

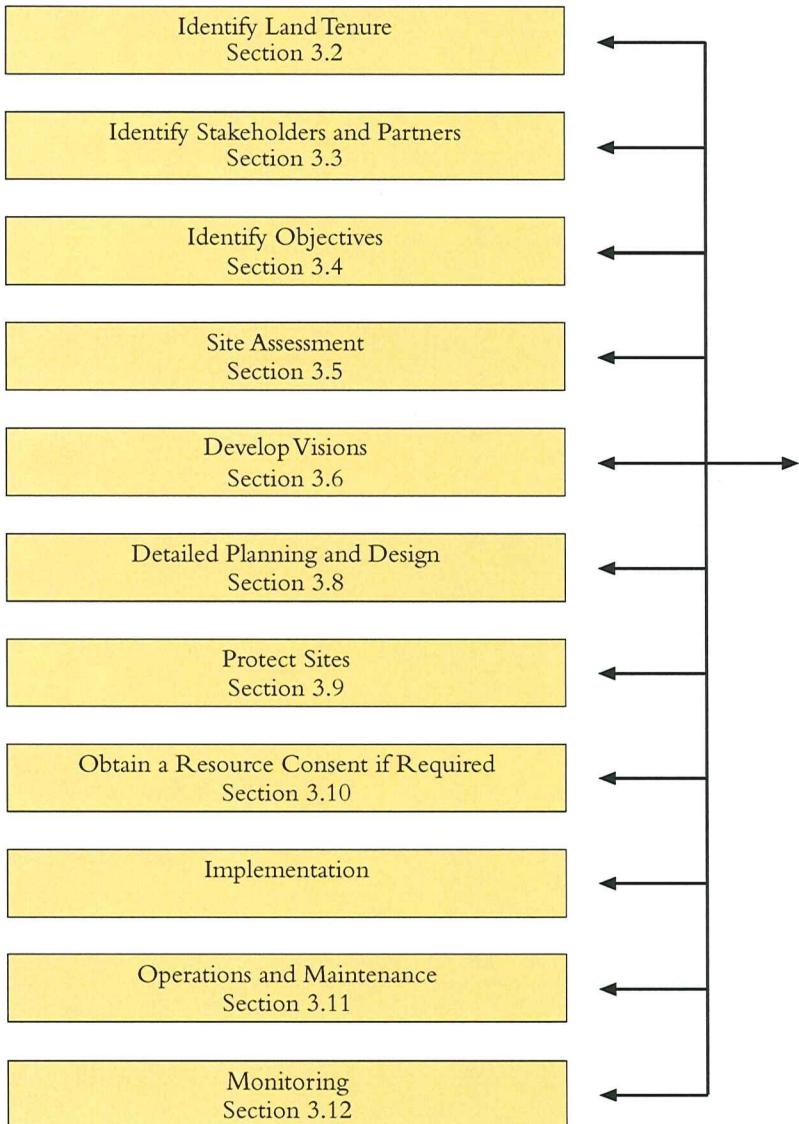


Table 3-1: Steps in Waterway and Wetland Restoration

3.2 Identify Land Tenure

Land tenure indicates who owns a site. Many waterways have been used as natural boundaries of properties; in such instances land tenure of the bed of the waterway has been managed in a variety of ways. Tenure may be held by the Crown, Environment Canterbury, the Christchurch City Council, or Iwi. Tenure may also be divided between two adjoining landowners (with the property boundary located in the waterway) or held solely by one private landowner.

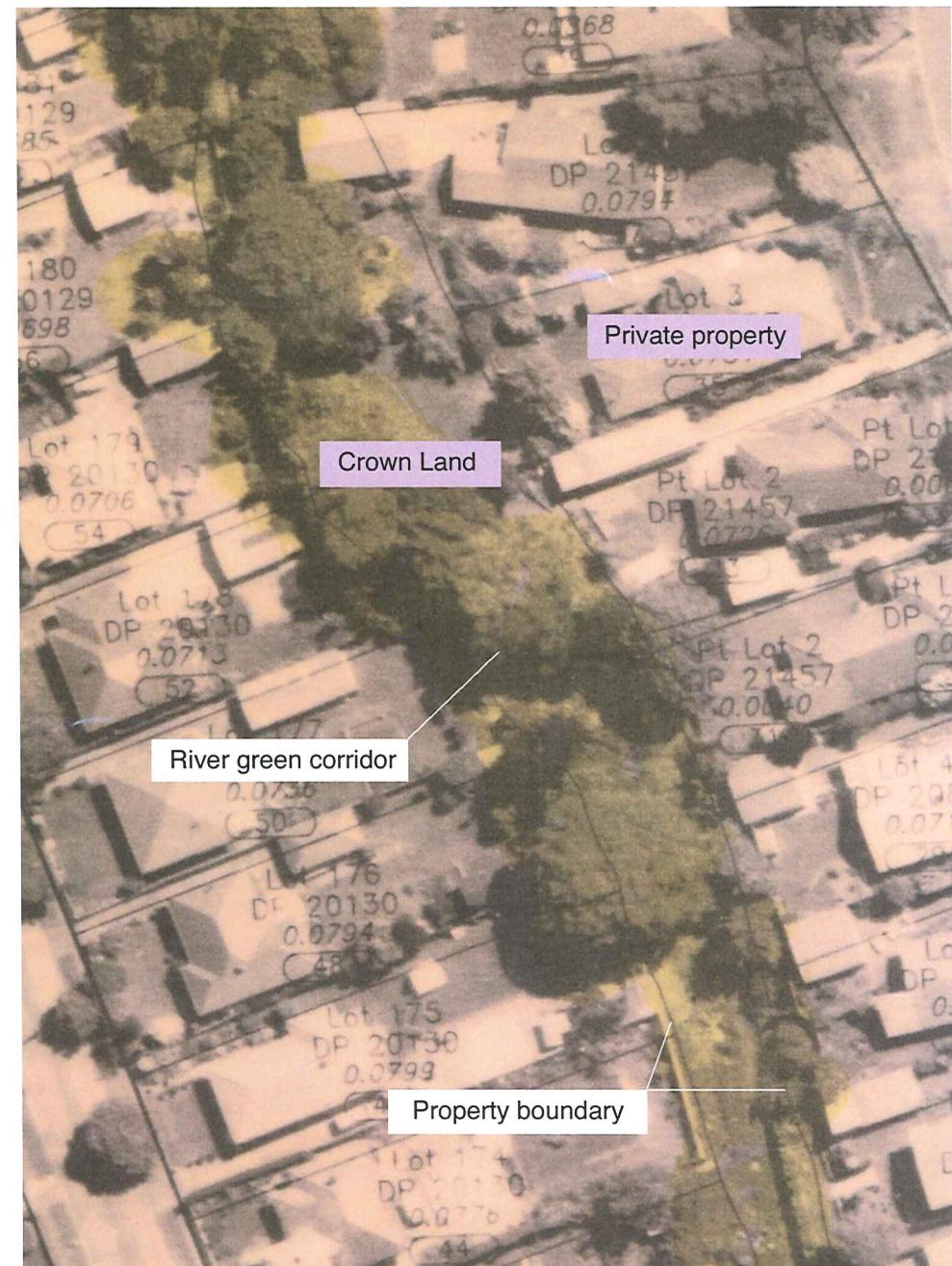
Fixed cadastral boundaries do not take into account the natural processes of a waterway, particularly the changes in its size, location, and adjacent landforms. Land tenure along a waterway does not necessarily correspond with actual land use.

Easements exist along many waterways to allow access for maintenance and other waterway-related activities. An easement may be located within a property to permit drainage, usually stormwater, to pass through from another property.

Clarifying Land Tenure

Information on land tenure is available from Land Information New Zealand. It may be necessary to survey cadastral boundaries to clarify their exact location.

Aerial photo with legal description overlaid. Note the relationship of the stream to property boundaries



3.3 Identify Stakeholders and Partners

Private developers tend to focus solely on their own land. However, developers should consider working with adjacent landowners to achieve the best environmental and community outcomes. Where more than one party has tenure of a waterway or wetland and its margins, it is important that stakeholders and interested parties work together to obtain integrated management of a site. This will help maximise opportunities.

Irrespective of ownership, the Christchurch City Council, Environment Canterbury, Department of Conservation, and Ministry of Fisheries have statutory responsibilities for aspects of waterways and wetlands management.

Community projects may involve work on public or private land. Selection of sites for protection and restoration will require consultation with all stakeholders.

Rivers provide opportunities for recreation



3.4 Identify Objectives

Clear objectives guide a project and allow evaluation of outcomes when a project has been completed.

Volume Two of the Proposed Christchurch City Plan contains the vision for the city (Table 3-2). The Plan provides objectives and policies to guide future development towards this vision.

Objectives for individual developments, land use activities, and community projects should reflect the objectives and policies in the Proposed Christchurch City Plan. This means that environmental outcomes and community aspirations must be taken into account, as well as economic criteria and individual wishes.

Examples of possible objectives are:

- to improve the quality of water entering downstream water bodies
- to provide habitat for wildlife
- to maintain and enhance heritage values
- to recognise and provide for cultural values and community aspirations
- to restore the relationship of Māori with waterways, ancestral sites and other tāoka
- to link existing green areas to form a network of green corridors
- to provide facilities for recreation
- to avoid flooding hazards
- to implement cost-effective and sustainable operational and maintenance regimes
- to reduce flooding problems downstream.

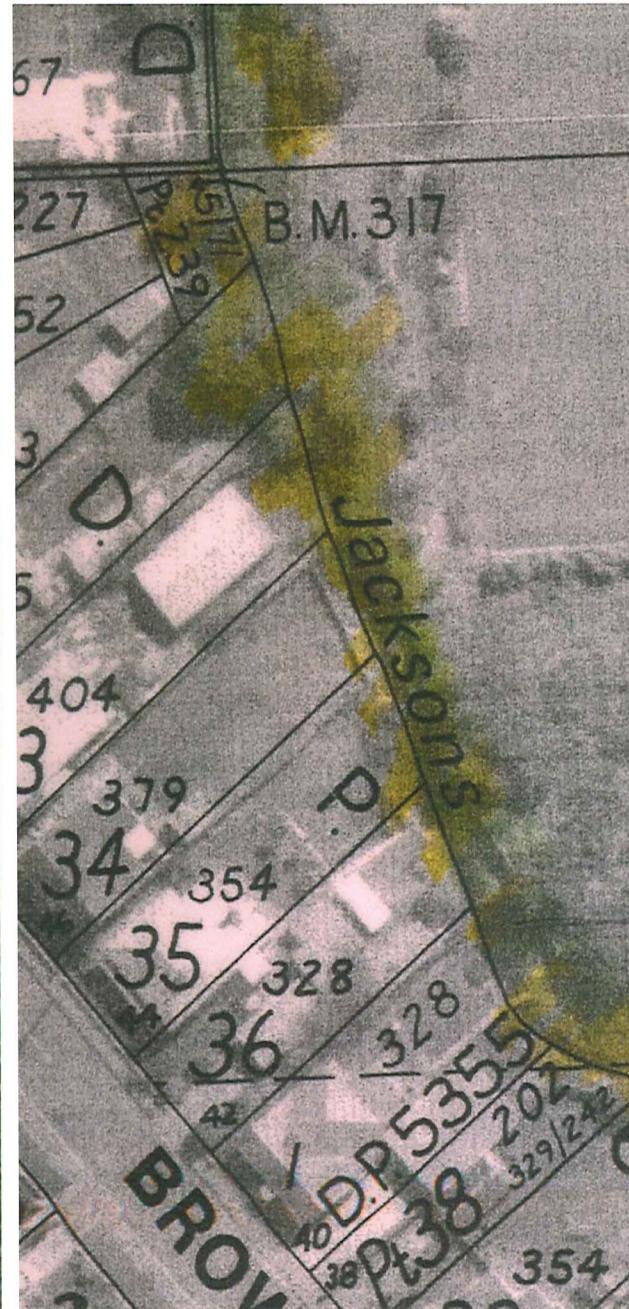
Objectives will need to be reassessed after site investigation and consultation to take new information into account.



A Vision for Christchurch

A Canterbury City	that reflects and acknowledges its unique identity, landscape and natural heritage.
An Attractive City	that enhances the pleasantness, aesthetic qualities and coherence of its buildings and landscapes.
A Creative City	that provides for the widest range of cultural, educational, and recreational opportunities.
A Consultative City	that involves all appropriate affected and interested people and groups in the process of decision-making.
A Fair City	that encourages a diversity of lifestyles, housing opportunities and community support.
A Green City	that protects its important natural habitats, landscapes, and ecological values and develops community environmental awareness and responsibility.
A Healthy City	that has clean air and water, low noise levels, minimises wastes and the effects of natural hazards.
A Heritage City	that recognises and values important old buildings, and its cultural history.
A Multicultural City	that recognises the benefits of cultural diversity.
A Safe City	that protects the community, personal health and security and avoids crime and injury.
A Sustainable City	that recognises the limits of the natural environment, takes account of the needs of future generations and encourages sustainable living.
An Efficient City	that recognises the benefits of efficient resource use, including recycling and energy conservation.

Table 3-2: A Vision for Christchurch - Proposed Christchurch City Plan, Volume 2



3.5 Site Assessment

Site assessment is the process of site survey and analysis, and includes investigation of statutory requirements and recognition of potential opportunities and conflicts. The scale of assessment will depend on the extent of the proposed project. When assessment is completed, visions and concept plans can be developed for discussion with interested parties.

Table 3-3: Site Assessment Considerations, offers a guide to the relevant components of site assessment for each waterway and wetland value. A multi-disciplinary approach will be necessary for most proposals. Existing information about a site will contribute to the assessment.

Volume 3 of the Proposed Christchurch City Plan outlines site assessment requirements for resource consents.

*Jacksons Creek
A natural waterway turned drain, ripe for restoration.*

Site Assessment – a checklist when planning for restoration

Ecology			
• Ecosystem type and health, eg salt marsh, freshwater wetland	<input type="checkbox"/>	• Existing use of area: activities, ages and number of people; time of day or year	<input type="checkbox"/>
• Soils	<input type="checkbox"/>	• Conflict between activities	<input type="checkbox"/>
• Slope	<input type="checkbox"/>	• Private and/or public use of site	<input type="checkbox"/>
• Substrate quality	<input type="checkbox"/>	• Access to site; access to and from water	<input type="checkbox"/>
• Vegetation description – riparian, aquatic, native, exotic	<input type="checkbox"/>	• Links to other recreational activities	<input type="checkbox"/>
• Natural processes	<input type="checkbox"/>		
• Waterway form – banks and channel	<input type="checkbox"/>		
• Water quality and quantity	<input type="checkbox"/>		
• Wildlife habitat/species	<input type="checkbox"/>		
• Pests and pollutants	<input type="checkbox"/>		
• Buffers: presence and extent of buffer zone	<input type="checkbox"/>		
• Ecological links	<input type="checkbox"/>		
• Protection of natural features and habitat	<input type="checkbox"/>		
Landscape			
• Visibility and legibility of waterways, wetlands and natural processes	<input type="checkbox"/>	• Character	<input type="checkbox"/>
• Vistas and views into, out of, or within a site	<input type="checkbox"/>	• Structures	<input type="checkbox"/>
• Prominence, visibility, and significance of landforms	<input type="checkbox"/>	• Natural remnants	<input type="checkbox"/>
• Sounds, smells, touch and movement (eg water, wind, people)	<input type="checkbox"/>	• Anecdotes, writings and photos	<input type="checkbox"/>
• Vegetation: size, form, type, colour, texture	<input type="checkbox"/>	• Scientific importance—soil, fauna and flora	<input type="checkbox"/>
• Built structures: size, material, style, colour, pattern, texture, age	<input type="checkbox"/>	• Archaeological sites	<input type="checkbox"/>
• Microclimates	<input type="checkbox"/>	• Relationship to surrounding areas	<input type="checkbox"/>
• Community perceptions of site, waterway, natural processes	<input type="checkbox"/>	• On-site information	<input type="checkbox"/>
• Relationship between built and natural features	<input type="checkbox"/>		
• Relationship to adjacent areas and activities	<input type="checkbox"/>		
• Importance within the local and wider landscape	<input type="checkbox"/>		
• Maintenance standards and expectations	<input type="checkbox"/>		
Recreation			
• Existing use of area: activities, ages and number of people; time of day or year	<input type="checkbox"/>	• Point and non-point discharges	<input type="checkbox"/>
• Conflict between activities	<input type="checkbox"/>	• Land use	<input type="checkbox"/>
• Private and/or public use of site	<input type="checkbox"/>	• Structures	<input type="checkbox"/>
• Access to site; access to and from water	<input type="checkbox"/>	• Maintenance	<input type="checkbox"/>
• Links to other recreational activities	<input type="checkbox"/>	• Access for workers and machinery	<input type="checkbox"/>
Culture			
• Different values: Māori, European, other	<input type="checkbox"/>	• Use of area	<input type="checkbox"/>
• Activities or events in the area	<input type="checkbox"/>	• Evidence of undesirable activity	<input type="checkbox"/>
• Sites of significance	<input type="checkbox"/>	• Informal surveillance	<input type="checkbox"/>
• Sense of place	<input type="checkbox"/>	• Walkway safety: lighting, sight lines	<input type="checkbox"/>
• Community aspirations and involvement	<input type="checkbox"/>	• Vegetation	<input type="checkbox"/>
• Bank gradients	<input type="checkbox"/>		
Heritage			
• Character	<input type="checkbox"/>	• Bank slumping; undercut banks	<input type="checkbox"/>
• Structures	<input type="checkbox"/>	• Liquefaction	<input type="checkbox"/>
• Natural remnants	<input type="checkbox"/>	• Utilities eg power	<input type="checkbox"/>
• Anecdotes, writings and photos	<input type="checkbox"/>	• Substrates	<input type="checkbox"/>
• Scientific importance—soil, fauna and flora	<input type="checkbox"/>	• Water-related diseases	<input type="checkbox"/>
• Archaeological sites	<input type="checkbox"/>	• Tidal effects	<input type="checkbox"/>
• Relationship to surrounding areas	<input type="checkbox"/>	• Pollutants, litter	<input type="checkbox"/>
• On-site information	<input type="checkbox"/>	• Structural safety	<input type="checkbox"/>
• Visibility	<input type="checkbox"/>	• Litter control and removal	<input type="checkbox"/>
Drainage			
• Springs and seepage	<input type="checkbox"/>		
• Rainfall	<input type="checkbox"/>		
• Water flow: quantity, quality, velocity	<input type="checkbox"/>		
• Channel form, flood capacity	<input type="checkbox"/>		
• Soils	<input type="checkbox"/>		
• Topography	<input type="checkbox"/>		
• Erosion and sedimentation	<input type="checkbox"/>		
Hazards			
• Bank slumping; undercut banks	<input type="checkbox"/>		
• Liquefaction	<input type="checkbox"/>		
• Utilities eg power	<input type="checkbox"/>		
• Substrates	<input type="checkbox"/>		
• Water-related diseases	<input type="checkbox"/>		
• Tidal effects	<input type="checkbox"/>		
• Pollutants, litter	<input type="checkbox"/>		
• Structural safety	<input type="checkbox"/>		
• Visibility	<input type="checkbox"/>		
• Litter control and removal	<input type="checkbox"/>		
Other Considerations			
• Statutory responsibilities and requirements	<input type="checkbox"/>		
• Zoning	<input type="checkbox"/>		
• Level of protection	<input type="checkbox"/>		
• Maintenance	<input type="checkbox"/>		

Table 3-3: Site Assessment Considerations

Further Sources of Site Information

In addition to on-site investigation, information can be obtained from the following sources:

- Christchurch City Council - eg proposed City Plan, Council Units
- Environment Canterbury - eg Regional Policy Statement
- Rūnaka - eg Te Whakatau Kaupapa, Ngāi Tahu Resource Management Strategy for the Canterbury Region
- local communities, including interest groups
- Department of Conservation
- New Zealand Historic Places Trust
- Fish and Game Council
- other experts: universities, Landcare Research, NIWA
- consultants
- libraries.



Waterways and Wetlands Asset Management Strategy

No	Project Area	Catchment
1a	Port Hills – Estuary	Heathcote
1b	Port Hills – Heathcote	Heathcote
1c	Port Hills - Halswell	Heathcote
2	Marshland	Styx and Avon
3	Lower Styx	Styx
4	Upper Styx	Styx
5	Otūkaikino	Waimakariri
6a	Avon Tributaries – above Mona Vale	Avon
6b	Avon Tributaries – Dudley / St Albans	Avon
7	Central City Neighbourhoods	Avon & Heathcote
8	Water Races	
9	Halswell / Wigram Growth Area	Heathcote
10	Estuary to Lagoon Green Corridor	Styx & Avon
11	Linwood / Woolston	Avon & Heathcote
12	Avon River Corridor	Avon
13	Heathcote River Corridor	Heathcote
14	Cashmere Stream and Ponding Area	Heathcote

The map illustrates the 14 project areas outlined in the table. Area 1A is a large grey area in the south-central part of the city. Area 1B is located in the northern part of the city. Area 1C is a smaller area in the southern part. Other numbered areas (2 through 14) are distributed throughout the city, often following river courses or coastal areas. The map also shows major roads: Main North Road, Main South Road, Halswell Road, Pages Road, and Columbus Street. The Waimakariri River flows from the west towards the Pacific Ocean. The Lyttleton Harbour is shown in the bottom right.

Figure 3-1 Project Areas: Waterways and Wetlands Asset Management Strategy

3.6 Developing Visions

The Christchurch City Council Waterways and Wetlands Natural Asset Management Strategy recognises the importance of visions in achieving a values-based approach to sustainable management of the city's waterways and wetlands. As a first step to evolving a workable approach, the district has been divided into 'project areas' determined by the nature of the land/water system, land use, and the character of local communities. Project areas are illustrated in Figure 3-1. A long term vision and strategy is being implemented in each area with Tākata Whenua and the Council.

Developing a vision includes reconciling the different values associated with waterways and wetlands, based on an understanding of the principles of sustainability. An understanding of the values will emerge from site assessment and consultation, essential initial stages in planning. This understanding will in turn highlight key objectives and provide clues for design and management decisions.

Visions can occur on many scales. Attention may be confined to a short stretch of waterway next to a single property. Alternatively, the focus might extend to a cluster of properties on either side of a stream, a tributary catchment, or the total catchment of a major city waterway. Whatever the scale, each locality should be considered in the context of an overall vision for a project area.

Turning a vision into reality may prove simple or complex. A vision may be realised by placing a fence around an area of regenerating native plants.

Equally, major earthworks might be necessary to

naturalise a utility waterway, as part of implementing a more complex vision. There is no 'right' way; only what is appropriate for each site.

Changes that occur over time should be taken into account. Plant size, land use, the numbers and ages of people who visit or use a site: all will change, whether in five, ten or 40 years' time. While it is not possible to predict changes in all their details, an imaginative vision can help manage their general effects and preserve long term sustainability.

A vision should be embodied in a concept or management plan to establish a common understanding and to enable discussion of alternatives, including the option of doing nothing. Informed feedback can be given to clarify issues and avoid confusion.

A concept or management plan is required as part of a resource consent application and to obtain funding for community projects. Innovative visions that achieve the objectives and policies in the Proposed Christchurch City Plan, but which fail to meet all the rules, should be discussed at the earliest opportunity with staff from the Parks and Waterways and Environmental Services Units.

Waterways and wetlands demonstration sites can provide inspiration and ideas for developing visions and for detailed design. Refer to Table 3-4 (Pg 3-28) for places to visit.

Styx River flowing into Brooklands Lagoon





3.6.1 Developing Visions: Ecology

A key objective of waterways and wetlands management in Christchurch is to restore ecosystems to improve ecological integrity. A system with ecological integrity supports viable, sustainable, and interactive natural communities that are in tune with the physical environment and provide for human needs. The principles to achieve ecological integrity are outlined below.

1. Protect and restore habitat / ecosystems

Consider:

- restoring under-represented systems, such as wetlands
- interconnections between species; between different aquatic organisms, as well as between adjacent riparian ecosystems
- riparian vegetation that provides tall trees for perching, food for wildlife, waterway shading to reduce instream temperatures, instream shelter, protection from predators, and suitable spawning sites
- access to, into, and along waterway systems for fish, birds and invertebrates
- regrading banks, restoring meanders, and planting riparian vegetation to enhance waterways and wetlands habitat
- using local native plants that have adapted over time to soil and weather conditions, and that are appropriate to underlying soil and drainage patterns where the landscape is unmodified. Soils in the Christchurch area range from very peaty loams to sandy soils; different plant communities would once have reflected this soil variation.

- establishing microclimates for particular plant species (such as ferns) and to regenerate any plants
- appropriate maintenance regimes and techniques.

2. Protect and enhance biodiversity

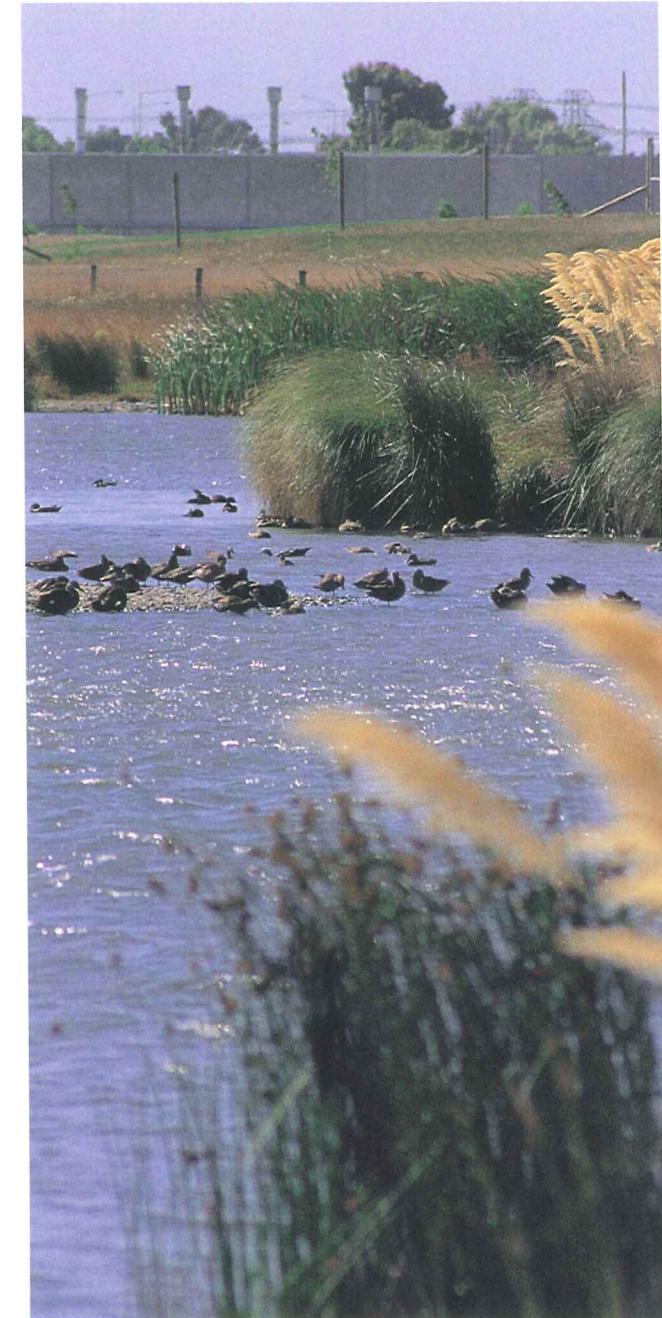
Consider:

- indigenous plants and animals to highlight New Zealand's unique flora and fauna
- creating habitat diversity to increase species diversity. For example, a waterway with meanders, riffles, and pools, and with varying widths, will have greater species diversity than a channelised waterway of consistent width and depth.

3. Create green networks

Consider:

- size, shape, and location; links to other habitats to create habitat viability
- spatial patterns for natural areas that are suitably close, and that are of a size and shape to maximise their ecological function
- establishing a natural green corridor network along city waterways to enable wildlife (especially birds) to move between habitats
- establishing habitats in appropriate proportions to the lifecycles of species reliant on them, taking into account seasonal changes and dispersal patterns
- opportunities to establish core habitat areas around waterways and wetlands.
- linking isolated native plant habitats by planting



- native plants along waterways. This activity recognises the natural heritage of Christchurch and provides habitat for native wildlife species.

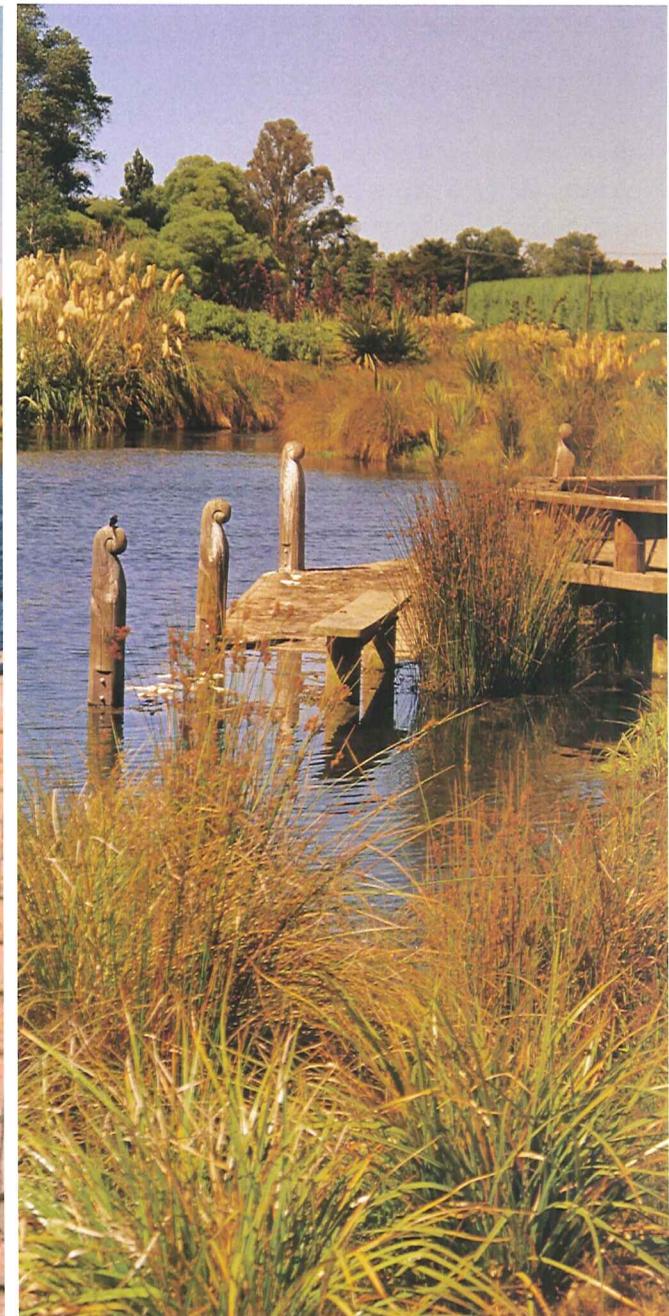
4. Control Harmful Impacts

People, cats, dogs, rats, mustelids, and weeds can be detrimental to the survival of wildlife and plants.

Consider:

- weed and pest control
- predator identification and control
- establishing islands or moats as refuges
- fencing to keep out rats, cats, dogs rabbits, people
- providing wide buffers if land area permits
- safe secluded areas for wildlife
- providing hides for people to view wildlife
- planting screens to obscure the movement of people from wildlife visibility
- restricting access to avoid disturbance at vulnerable times in life cycles eg inanga spawning and bird nesting
- cat and dog free areas
- nest boxes.

The koru pattern found in nature is reflected in the construction of the jetty at Janet Stewart Reserve.



3.6.2 Developing Visions: Landscape

The waterways and wetlands of Christchurch have a range of visual appearances that reflect not only their underlying nature, but the management practices and design styles of the previous 150 years. The Christchurch City Council seeks to make waterways and wetlands more prominent features in the landscape by exposing and restoring their special qualities, and by developing a management approach that builds on local, city, and national identity. The following principles will assist this process.

1. Understand all the values and use these as design and management clues

Interested parties and the general community will accept long term visions only if aspects important to them have been considered and incorporated where possible. A vision that contains these aspects will help generate a greater 'sense of place'. Knowledge of what is important to a community will emerge only from good site assessment and consultation in the early stages of a project, and by encouraging interested groups to become involved in the decision-making that leads to development of the long term vision.

Consider:

- the composition of interested parties and the wider community: children, senior citizens, families, tākata whenua, interest groups, ethnic groups, developers, commercial operators
- all the values: ecological, recreational, heritage, cultural, drainage, and landscape
- protecting important features
- translating and re-interpreting values by means of artworks, names, symbolic plantings.

2. Imitate nature where appropriate

Imitating nature and understanding natural patterns is often appropriate in restoration projects. Much can be learned from studying and copying what nature does.

Consider:

- transforming channelised waterways into natural meandering streams
- allowing for natural movement of waterways
- reducing maintenance to develop wild areas.

3. Enhance city identity and the garden city image

Christchurch is known nationally and internationally for its rivers and 'Garden City' image that incorporate European traditions of garden design and the



informality of natural environments. In recent years, the image has come under increasing pressure from urban consolidation. Loss of large private gardens from infill housing has not been compensated for by a similar increase in public open space. Protection and enhancement of green corridors associated with waterways and wetlands will become increasingly important if Christchurch is to retain its Garden City image.

Consider:

- growing large trees along waterways to highlight their location in the landscape
- retaining and enhancing the meanders of the city's waterways to highlight their contrast with the grid pattern formed by streets and buildings

- establishing and maintaining green corridors to form natural boundaries between local communities, and to provide links by walkways and cycleways along river margins.

4. Enhance local identity

Local identity evolves from recognising and building on the unique features of a site. Good site assessment and consultation provide knowledge about an area's history, topography, soils, plants and wildlife, and the design and materials of existing structures. All these features provide design and management clues; building on them will create a sense of belonging for people who know and visit a site.

Consider using:

- plants endemic to the local area
- volcanic rock on the Port Hills
- Waimakariri River stones on the Plains
- paving that reflects local soil colours
- paving patterns that reflect local Māori weaving patterns
- building materials and styles consistent with what is commonly found in the area
- artworks that add to an understanding of the locality
- unmodified river terraces and associated landforms as features.

5. Understand and enhance people's experiences of a site

How a person perceives a waterway or wetland is based on his or her experience. A site will be perceived differently by someone who visits it frequently, from someone who views it from a distance or who glimpses it fleetingly on the way to work. If an area is pleasant, people will want to return regularly and will accord it a high value.

Consider:

- links and relationships with adjacent land uses
- the sense of entry to and departure from the site
- positioning seats to encourage pause and reflection
- protection from winds, especially where people congregate
- provision of shade for summer enjoyment and sunny areas for other times of the year
- the range of activities, interpretation, and views
- the experience of pleasant surprises and mysteries
- enhancing an area as a landmark within a community
- safer city design to minimise danger
- the level of care or maintenance required
- the presence of 'nature'.

6. Help people enjoy and learn about nature while protecting and enhancing functional ecosystems and natural processes

The presence of nature within a city helps people to appreciate and understand natural processes and ecosystems. For wildlife to survive they need to be part of a functional ecosystem that provides viable habitats (eg food, protection from predators). The balance of wildlife and people at a location will depend on the outcomes sought for the section of waterway involved. Good design often caters for the needs of both.

Consider:

- creating barriers between people and wildlife (eg moats, fences)
- retaining some areas specifically for wildlife
- signs and information panels to educate people about the needs of wildlife
- constructing special areas where wildlife can be observed.

7. Increase the legibility and visibility of the river ecosystem

The drainage system within the urban environment consists largely of an underground piping network or channelised drains hidden behind high fences. Many people have little or no understanding about drainage patterns, including the sources of the city's major waterways. Exposing and highlighting the city's waterways and wetlands (including pipes) will encourage increased environmental awareness of the drainage system of Christchurch.

Consider:

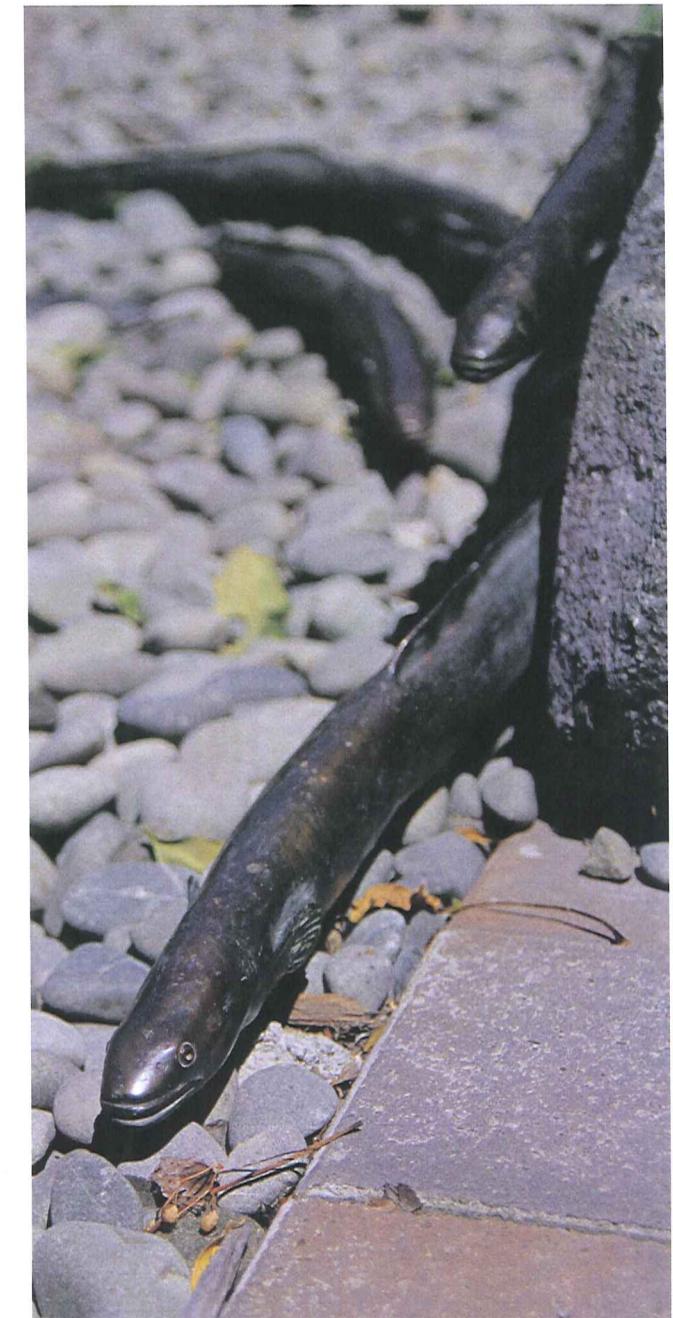
- using open swales rather than kerbside channels and piping in any new development
- investigating opportunities to replace existing piping with open waterways (daylighting). If not currently feasible, allow sufficient space for it to happen in the future
- maximising views of waterways and wetlands from private and public properties (eg road crossings)
- identifying and protecting sources of waterways such as springs, and making them more visible within the landscape and to the public
- creating access along waterways and around wetlands
- re-creating wetlands, floodplains and natural waterway profiles as part of waterway and wetland restoration
- retaining topographical variations within new housing developments and where new roads are formed, eg depressions in roads where they cross waterways
- maintaining visibility of waterways and wetlands by means of building setbacks and appropriate planting.

8. Create a landscape feature of waterways and wetlands on property boundaries

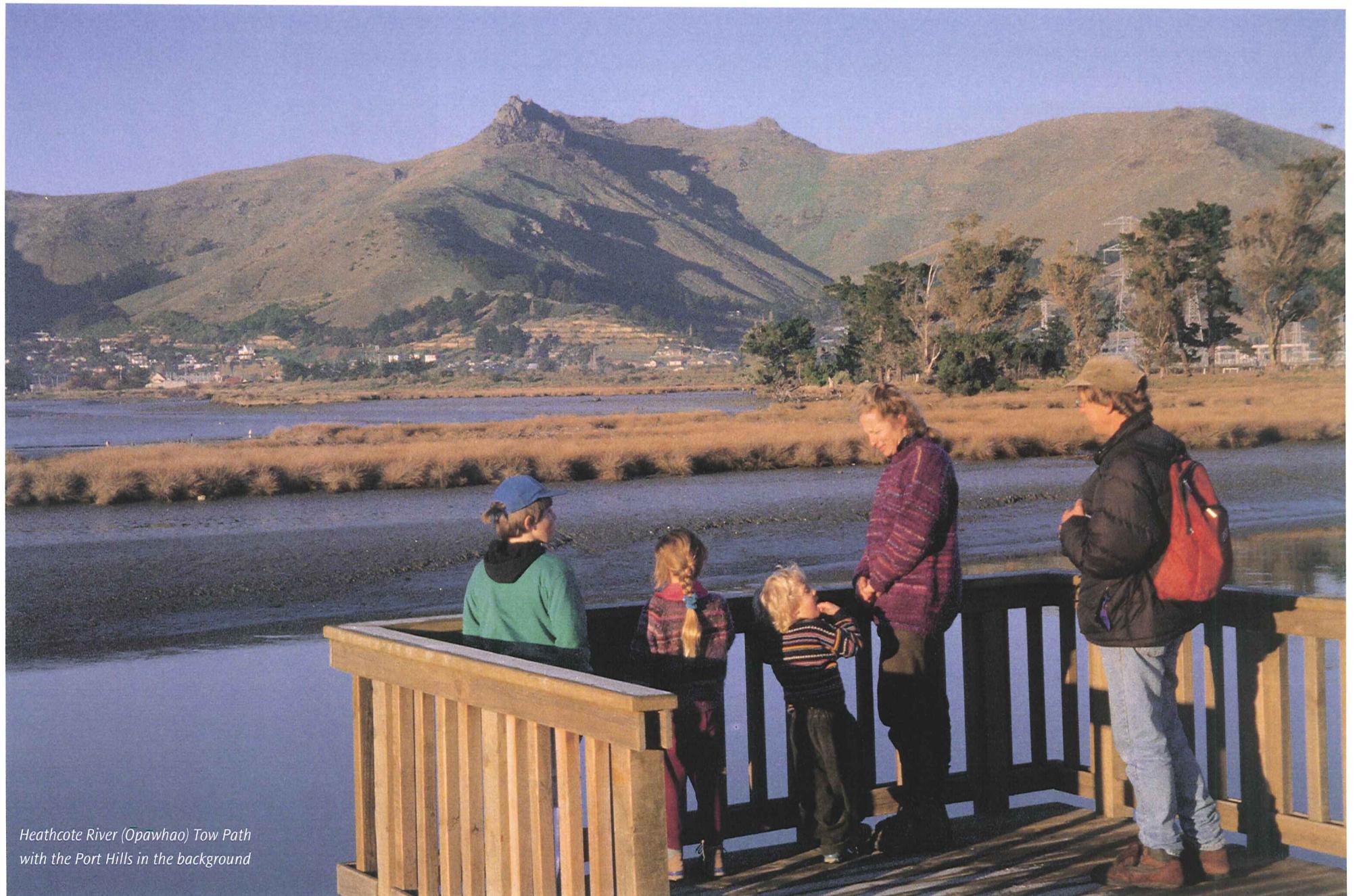
The management of boundaries between waterways and wetlands and private properties is influenced by many factors: private property rights, adjacent land uses, child safety requirements, control of pets, and a perceived need of security from criminals. These factors have often led to waterways and wetlands being fenced off and ignored, particularly smaller tributary waterways. Visually opening up waterways and wetlands will encourage adjacent residents to view them as important features in the landscape. Moreover, the increased visibility that results will promote greater neighbourhood security.

Consider:

- removing fences between waterways and wetlands and houses, and integrating garden planting with waterway and wetland planting
- using a see-through fence, should a fence be required. This will enable informal surveillance of people using the waterway or wetland area. A gate can be incorporated in the fence to allow physical access to the water
- using suitable plants strategically placed to provide privacy.



Eel migration sculpture by Bing Dawe, Farnley Reserve, Heathcote



Heathcote River (Opawhao) Tow Path
with the Port Hills in the background

3.6.3 Developing Visions: Recreation

Integrated concept planning increases the range of activities and recreational opportunities available near waterways and wetlands. Some guiding principles follow.

1. Provide for a diversity of recreational experiences

A waterway or wetland offers a different type of recreational experience from a traditional reserve or district park.

Consider:

- boating
- fishing
- walking
- picnicking
- children's play
- education (eg pond dipping, insects, cultural associations, historical and geological features)
- botany
- bird watching eg bird hides
- contemplation eg resting spots, seats
- cycle paths.

2. Seek opportunities to extend walkway and cycleway links within a locality and beyond

Consider links between:

- hills, plains, and the coast
- different neighbourhoods, communities and towns
- community focal points such as schools, reserves, churches, libraries, historic sites and shops

- urban and rural landscapes
- existing and potential green corridors
- different habitats.

3. Seek opportunities for access

Visual and physical access to riparian margins will enable people to appreciate and value waterway and wetland environments.

Consider:

- views from streets
- walkway and cycleway links
- access to water-based activities via structures such as jetties and steps to the water
- access for a range of ages and abilities
- legal protection for access.



Above: Fishing from the Styx River
Below: Canoeing on the Heathcote River





3.6.4 Developing Visions: Heritage

Heritage includes several kinds of significance associated with human activity or natural processes: historical, archaeological, architectural, technological, aesthetic, scientific, spiritual, social, and traditional significance. Likely heritage buildings, places and objects associated with waterways and wetlands include bridges, buildings, culverts, drainage structures, industrial sites, transport, trees, ecosystems, places of recreation, and areas of significance to tākata whenua. The following principles guide concept planning.

1. Identify, acknowledge and maintain cultural heritage

Consider:

- site significance
- relevant legislation
- conservation and protection requirements
- appropriate site use and management
- ongoing research to identify unknown or under-researched heritage buildings, places and objects.

2. Identify, acknowledge and protect natural heritage

Consider:

- natural landforms eg terraces, old river channels, rock outcrops
- flora, fauna, and ecosystems
- wetlands, springs, natural drainage patterns, natural waterways
- soil profiles
- old native timbers eg stumps buried in the ground.

Inwood's Mill, Hereford Street Bridge, 14 March 1861

Dr. A.C. Barker, Canterbury Museum Ref. 263c



3. Consult with tākata whenua and other interested parties.

Consider:

- heritage activities associated with riverbanks, waterways and wetlands
- Wahi tapu sites
- archaeological sites (Te Rūnanga o Ngāi Tahu has a policy regarding accidental discovery)
- other heritage protection organisations and individuals when identifying cultural heritage sites and their protection or modification (such as council heritage planners and the New Zealand Historic Places Trust/Pouhere Taonga)

4. Promote appropriate interpretation to increase public awareness and understanding of the significance of heritage features

Consider:

- a range of interpretation possibilities, such as tours, signs, and publications
- placement of appropriate interpretation (eg object, structure, or panel) that maintains the integrity of past historical association
- all time periods when identifying cultural heritage buildings, places, and objects

5. Statutory responsibilities to protect heritage values

New Zealand has a statutory obligation under the Resource Management Act (1991) to safeguard its cultural heritage for present and future generations. Local authorities have primary responsibility for protecting heritage; every effort should be made to maintain known cultural heritage buildings, places, and objects associated with waterways and wetlands.

A number of these cultural heritage buildings, places, and objects are listed by the Historic Places Trust/ Pouhere Tāonga under Section 23 of the Historic Places Act, and in the Proposed Christchurch City Plan. These buildings, places, and objects are regulated by the appropriate sections of the Historic Places Act 1993, the Resource Management Act 1991, and the Proposed Christchurch City Plan.

Part 1 of the Historic Places Act 1993 provides protection for archaeological sites, including places associated with human activity prior to 1900 – for example, the riverbanks of waterways. It is an offence to damage, modify, or destroy a site without authority to do so from the Historic Places Trust/Pouhere Tāonga.



Inwood's Mill, Hereford Street Bridge, 14 March 1861

Dr. A.C. Barker, Canterbury Museum Ref: 263c

3.6.5 Developing Visions: Culture

Culture evolves as people adapt to their environment. Tākata Whenua and settlers in Christchurch responded to waterways and wetlands differently. Mahika kai collected from waterways and wetlands nourished early Māori, while waterways provided transport routes for Māori and early European immigrants. Later, settlers drained areas to create dry sites for houses and to reduce the incidence of waterborne disease.

The following principles should be taken into account when developing plans.

1. Identify and highlight the range of cultural values, landmarks, and activities in the landscape

Consider:

- using place names that have significance in the area
- different tree species, eg pines, willows, natives
- bridges eg Bridge of Remembrance
- boat sheds
- punting
- floral displays on or along waterways
- establishing sites for production of cultural materials, eg flax for weaving
- restoring habitat and providing access for fishing eg whitebaiting, trout fishing, eeling.

Right: Bridge of Remembrance



2. Protect important sites

Consider:

- protecting funeral sites eg Ōtūkaikino Wetland, used as a memorial site and thus classified as a wai-o-tapu
- protecting significant sites eg Riccarton Bush, Travis Wetland
- avoiding unnecessary mixing of different types of waters
- how to respect the cultural sensitivity of certain sites
- education to protect cultural values.

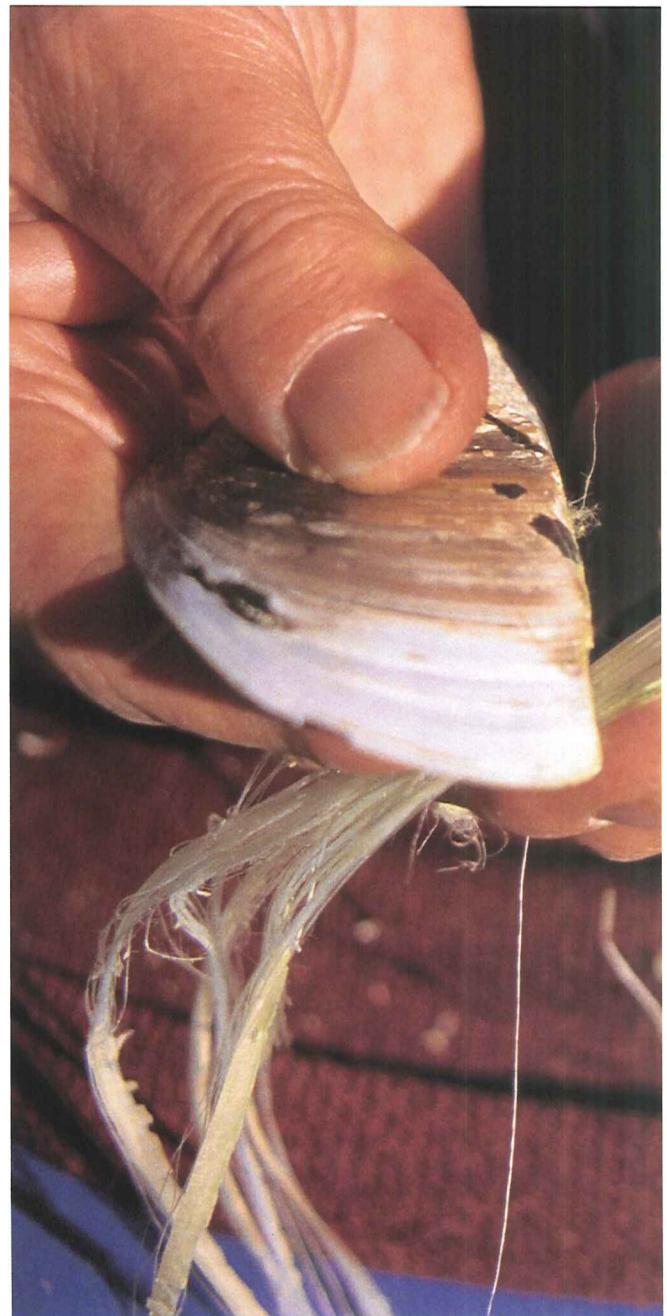
Work in Partnership with Communities

Consider:

- the range of stakeholders and partners in a project eg tākata whenua, community groups, and other agencies.

Refer to Figure 2-3 the Black Map, to identify sites of significance to Māori. If a significant site is identified, seek further information at an early stage from the Parks and Waterways Unit.

Pa Harakeke - Janet Stewart Reserve



3.6.6 Developing Visions: Drainage

The natural drainage system of Christchurch is a complex relationship between groundwater, surface water, and the Waimakariri River. This system has been highly modified as a result of urbanisation. Previous solutions to problems of drainage management are not usually sustainable in the longer term, and may not be considered acceptable as part of any new development. Consider the following principles when planning for drainage design.

1. Understand and work with natural features and patterns

Consider:

- soakage in areas with high permeability soils
- identifying and protecting springs and seepage areas
- preserving natural waterways, wetlands, and ponds.

2. Understand and work with natural processes

Consider:

- natural water flow under different climatic conditions
- erosion and sedimentation
- seasonal and other changes
- climate change
- sea level rise.

3. Understand and work with hydrological and hydraulic principles

Consider:

- storm events, rainfall intensity and duration
- reviewing historical records to determine and predict changes
- water quantity, both high and low flow
- water velocities
- capacity of waterway system to convey water.

4. Seek to improve water quality

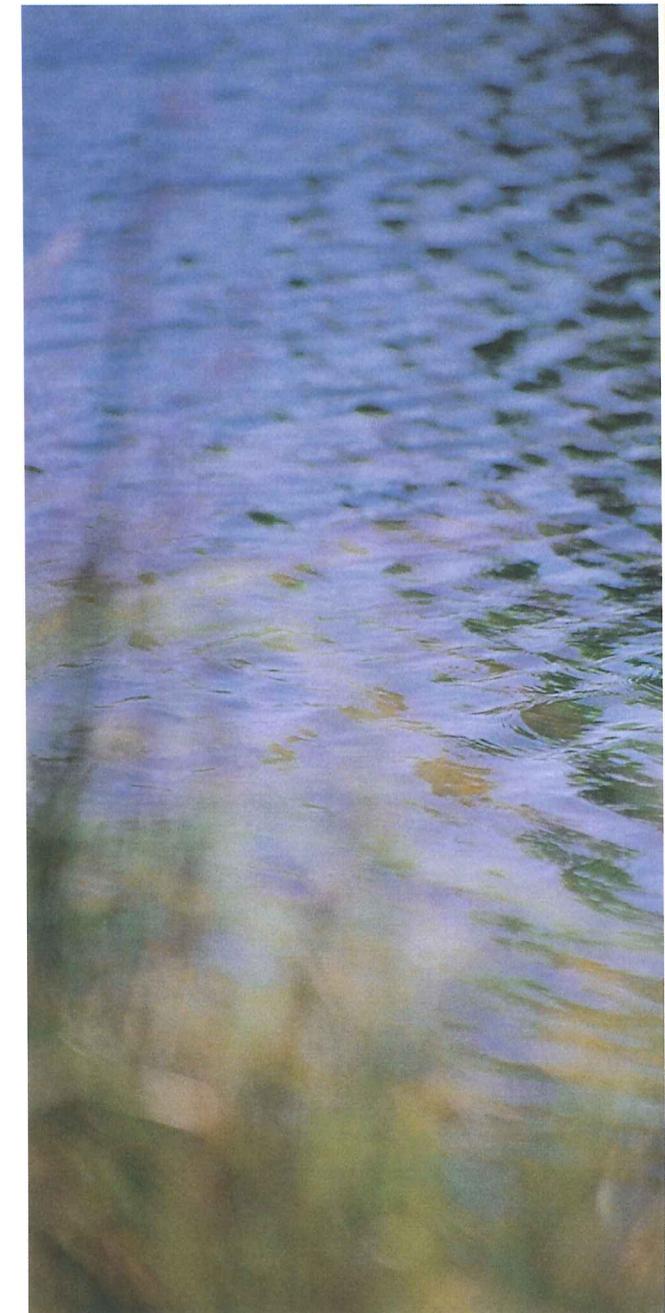
Consider:

- swales, retention basins, soakage systems and wetlands to filter sediment and pollutants
- appropriate plants (eg sedges and rushes) to trap sediment
- soil conservation
- riparian planting
- avoiding point discharge from hard standing areas and construction sites
- litter control.

5. Develop sustainable solutions

Consider:

- appropriate land use
- recognition and remedy of previous drainage practices
- discharge of roof water to ground soakage.



- whether management solutions are cost-effective in the long term
- provision for other values that may require an increase in water flow levels in the future
- providing sufficient space for the system to operate in the event of failure, by designing for over-capacity or secondary flow paths
- how to reduce maintenance requirements.

6. Provide for maintenance and operations

Consider:

- life cycle design principles
- clear guidelines for maintenance teams
- responsibility for maintenance
- access for workers and machinery
- flood capacity
- the means of providing for wildlife
- ways to avoid erosion without using extensive hard structures
- the life expectancy of the system
- the safety of workers and the public
- litter and sediment control
- pest management
- the need for, and maintenance of, structures.



3.7 Consider Safety

Safety is important; the following safety principles guide concept planning for waterways and wetlands.

3.7.1 Maximise opportunities for informal surveillance

Consider:

- using low or transparent fences, or removing fences altogether
- promoting a neighbourhood's sense of ownership by installing gates in residential fences that border a reserve, and by encouraging locals to report vandalism or suspicious activity.

3.7.2 Encourage positive use of public areas

Consider:

- providing children's play areas
- incorporating walkways and cycleways.

3.7.3 Provide for safe walking

Consider:

- clear indication of access into and out of an area (eg signs such as "Path through to..." and "No Exit")
- keeping paths away from densely bushed areas, and careful location and design of clumps of bush to minimise 'stranger danger'
- appropriate locations for seats
- providing lighting only where use of a path is essential at all times. If not essential, encourage the use of alternative safe routes.

- modifying a bank gradient if necessary to enable easy exit from water.

3.7.4 Provide for safe maintenance and operations

Consider:

- relevant OSH and Christchurch City Council legal responsibilities
- Building Act requirements
- the implications of system failure or blockage.



Above: Maintaining the river bank

Below: Houses overlooking Corsers Stream provide informal surveillance



Table 3-4: Waterways and Wetlands Sites

Waterway or Wetland Type	Waterway/ Wetland	Location	Features
Tributary waterway - lowland	Corsers Stream	Brooker Avenue	
Tributary waterway - lowland	Wairarapa Stream	Walkway between Seven Oaks Drive and Wayside Avenue	
Tributary waterway - lowland	Steam Wharf Stream	At St Johns Court, St Johns Street. Esplanade Reserve between Alport Place and Dyers Road. At Thistledown Reserve, off Portman Street Alport Place to Heathcote River	
Tributary waterway/pond/reserve	Papanui Stream	Erica Reserve – Grants Road, Papanui	
Tributary waterway - lowland	Kaputone Creek	Sheldon Park, Belfast	
Tributary waterway - lowland	Jacksons Creek	Cameron Reserve – between Austin and Cameron Streets	
Tributary waterway - lowland	Dudley Creek	Bellevue Terrace Stapletons Road McFaddens Road, Jamieson Ave	
Tributary waterway - lowland/ utility drain	Ilam Stream	Kirkwood Intermediate School - off Karamu Street	
Tributary waterway - lowland	Ilam Stream	Adjacent to 48 Ilam Road (view from road).	
Tributary waterway - lowland	Waterloo Road Drain	Westmark subdivision, Waterloo Road	
Tributary waterway - lowland	Nottingham Stream	Nicholls Road and corner Halswell Road and Halswell Junction Road	
Tributary waterway - lowland	Shirley Stream	Along Quinns Road and Orontes Road	
Tributary waterway - lowland/pond/wetland	Old Lake Outlet at Horseshoe Lake	Access off Reaby Street	
Waterway - created	Angela Stream	Travis Wetland / Travis County Estates	
Waterway - hill	Dry Bush Sream	Access off Summit Road	

Table 3-4: Waterways and Wetlands Sites continued

Waterway or Wetland Type	Waterway/Wetland	Location	Features
River	Avon River	Amelia Rogers Reserve	
River	Avon River	Bower Street Outfall	
River	Heathcote River	Farnley Reserve - behind Centaurus Road shops	
River	Heathcote River	King George Park – Aynsley Terrace near Hansons Park	
River, tidal, semi-saline	Heathcote River	Woolston Loop	
River, tidal, semi-saline	Heathcote River	Devil's Elbow (left bank) Ferry Road to Settlers Crescent	
River	Styx River/ Gibsons Drain	Janet Stewart Reserve – corner Marshland and Lower Styx Roads	
Open utility - tidal and saline	Brookhaven	Brookhaven. Kotuku Crescent to Steam Wharf Stream	
Open utility waterway	Riccarton Main Drain	Paeroa Reserve, Riccarton	
Open utility and stormwater ponding	Addington Drain	Tranz Link, Riccarton	
Wet/dry Basin	Wrights Road Retention Basin	Corner Wrights and Lincoln Roads	
Wetland/wet basin	Wigram Retention Basin	Access off Warren Crescent – near new Showgrounds	
Wetland - freshwater	Ōtūkaikino Wetland	Main North Road, near Marshlands Road	
Wetland - freshwater and semi-saline	Cockayne Reserve	Lower Avon, Avondale Bridge	

Key to Table

Symbols	Feature	Symbols	Feature	Symbols	Feature	Symbols	Feature
	Bridge		Planting		Seating		Greenfield development
	Boardwalk		Engineering		Interpretation/signage		Park or reserve
	Jetty		Artwork		Created landforms		

Landowner and Council in Covenant to Conserve Wetlands

Marie Hedges (pictured) has become one of the first people to enter a conservation covenant with the Christchurch City Council to restore and protect wetlands on private property.

The covenant, registered permanently on the title of Ms Hedges' 200 hectare farm at Harewood, requires her to protect wetland areas on her property from stock and other activities that are likely to cause damage. In return, the Council agrees to provide surveying, fencing, planting and maintenance.



3.8 Detailed Planning and Design

The detailed planning sections of this Guide provide guidelines for each component of the waterways and wetlands system.

Work in teams with professionals who have relevant expertise; for example, landscape architects, ecologists, engineers, tākata whenua. An inter-disciplinary approach is imperative to achieving sustainable outcomes.

Read chapters that may not apply directly to your field of expertise and incorporate relevant information into planning.

3.9 Protecting the Site

Waterways and wetlands often have significant natural values that require legal protection. Habitat restoration carried out on private property also requires legal protection to safeguard the investment of council, residents and developers. Legal mechanisms are listed in the adjacent table. Further advice can be obtained from your lawyer, surveyor or the council.

Physical protection may also be required when earthworks and other building activities are occurring on land adjacent to waterways and wetlands. This may take the form of temporary fencing, and identifying and avoiding potential causes of damage.

Similarly, newly restored and sensitive areas may need to be protected from people and animals. Fencing will indicate to people the area to avoid.

Table 3-5: Legal Protection Mechanisms

Mechanism	PROs	CONs
Esplanade Strip Agreement Resource Management Act Section 235	<ul style="list-style-type: none"> Survey costs may be less than for a conservation covenant Have delegation from Council to an officer subcommittee 	<ul style="list-style-type: none"> Legal costs may be more than for a conservation covenant (Depends on how many people have a registered interest in the land – registered easement, mortgage, caveat, lease) Can only register an esplanade strip agreement with the landowners consent, the only exception being when it is required as part of a subdivision agreement. Not shown on survey plan Subsequent difficulties when land is subdivided Only found by searching copy of esplanade strip agreement itself Only applicable when dealing with land adjacent to sea, lake, river or stream
Conservation Covenants Reserves Act Section 77	<ul style="list-style-type: none"> Legal costs may be less than for an esplanade strip agreement as you do not require the consent of all persons with a registered interest in the land Shown on survey plan No difficulties when land is subsequently subdivided Shown on plans held at Land Information New Zealand Land does not have to adjoin water There is delegation from council to an officer subcommittee 	<ul style="list-style-type: none"> Survey costs may be higher than for an esplanade strip agreement
Easement Land Transfer Act	A full survey is not required unless a right of way is involved	<ul style="list-style-type: none"> Perception that compensation should be payable The matter needs to be reported to council as there is currently no delegation to officers.

3.10 Obtaining a Resource Consent

A resource consent permits an activity that would otherwise be prohibited by a rule in a regional or district plan. In Christchurch, a number of planning documents have legal status and contain rules that control the use and development of natural and physical resources.

Resource consents are granted pursuant to the Resource Management Act (1991) by a number of ‘consent authorities’, depending on the type of resource consent applied for.

Refer to Part B for general guidelines on resource consents.

Refer to the Christchurch City Council and Environment Canterbury for information on resource consents relevant to your proposal.



Angela Stream bordering Travis Wetland

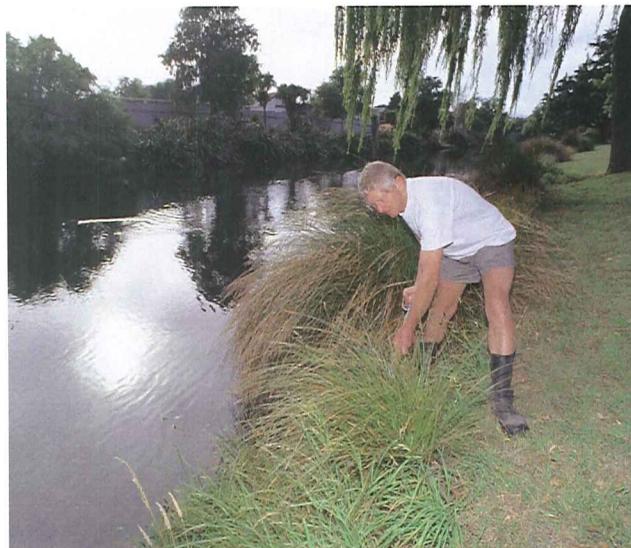
3.11 Operations and Maintenance

Operations and maintenance should be considered early in the planning process to ensure that desired outcomes are fully realised.

Access must be provided for workers and/or machinery to clear excess aquatic vegetation, remove sediment from wetlands, clear channels and maintain riparian areas and flood plains.

The objectives that underlie maintenance activities are:

- to implement cost-effective and sustainable operational and maintenance regimes that support the vision and satisfy community expectations for the waterway or wetland
- to maintain Council assets in the same or improved condition in perpetuity
- to provide appropriate waterway flow capacity for normal conditions and storm events.



An appropriate operations and maintenance regime will help ensure protection, enhancement and maintenance of the values associated with waterways and wetlands (ecology, landscape, recreation, heritage, culture and drainage).

A further desirable outcome will be a satisfied community, who will be more likely to appreciate waterways and wetlands values and support the Parks and Waterways Unit management philosophy.

It is desirable that an owner participate in planting, nurturing and maintaining 'their' waterway or wetland, since most are located on private property.

The stewardship and goodwill of property owners is essential; always consider the implications of work located on both private and public land.

References to operations and maintenance requirements may be found throughout this Guide.



3.12 Monitoring

Monitoring is the process of making repeatable measurements and analysing the results to detect changes. Consider monitoring as part of every waterway restoration project, as a measure of sustainability.

3.12.1 Why monitor?

Information collected through monitoring can be used to ensure that waterways and wetlands values are met by innovative planning. It is important to analyse monitoring data so that approaches can be adapted and lessons learned.

Measurements can be taken to ascertain:

- public perception of waterways and wetlands restoration projects
- changes in the aquatic community (ie fish, invertebrates and aquatic plants)
- changes in water quality
- hydraulic effectiveness, efficiency and character of waterways, wetlands, and drainage projects against the set objectives for those projects
- whether plant species used for waterways and wetlands are suitable. Considerations include ease of establishment, maintenance of floodpaths, and the ongoing maintenance requirements of the species and the instream environment (e.g. provision of access to clear weeds)
- compliance with resource consent conditions; for example, whether a stormwater treatment system is working
- heritage sites surveyed and registered

- whether the environmental results specified in the Proposed Christchurch City Plan are being achieved.

3.12.2 Setting Objectives and Methods

Monitoring can be short or long term. Costs will vary depending on what is being monitored, how frequently and for how long monitoring takes place, and what techniques are used. Objectives must be clearly defined and the methods to achieve them efficient and repeatable. Monitoring methods may include:

- setting up photo points to assess changes through time

- hydrological modelling of engineering works or of the stream itself
- sampling stream invertebrates, aquatic plants, and fish communities
- plant surveys to assess size, health, and spacing of plantings
- surveys to assess the sustainable ecological functioning of ecosystems
- surveys or meetings to gauge public perception of design
- comprehensive records of changes during site visits.



Taking an invertebrate sample from Knights Stream