Significant Asset Identification Guide
(INFFER step 1)

Geoff Park, Anna Roberts, April Curatolo, Stephanie Spry, Sally Marsh and David Pannell

Introduction

The Investment Framework For Environmental Resources (INFFER) is a tool for planning and prioritising public investments in natural resources and the environment. It focuses on achieving outcomes cost effectively.

INFFER is intended to be used for projects that have a clear focus on protecting or enhancing specific natural resource assets. It is not intended for assessment of projects with a focus on general education, awareness raising, capacity building or research that is untargeted to specific assets. However, these actions can be included in projects that aim to benefit particular assets, and indeed may be crucial components of these projects.

Identification of assets is step 1 in the INFFER process (Table 1).

Table 1. Steps in the INFFER process*

	Description of Step	**Relevant Document**
1.	Develop a list of significant natural assets in the relevant region(s)	"Significant Asset Identification Guide" (this document)
2.	Apply an initial filter to the asset list, using a simplified set of criteria	"Filtering Significant Assets Prior to Detailed Assessment"
3.	Define projects and conduct detailed assessments of them	"Project Assessment Form", and "Project Assessment Form Instruction Manual"
4.	Select priority projects	"Selection of Priority Projects"
5.	Develop investment plans or funding proposals	"Development of investment plans or funding proposals"
6.	Implement funded projects	"Implementation of funded projects"
7.	Monitor, evaluate and adaptively manage projects	"Monitoring, Evaluation and Adaptive Management following INFFER Assessment"

* See the document "Introductory Overview of INFFER" for more information.

The thinking behind this step

INFFER is an asset-based approach to prioritisation. We start by identifying assets and structure the assessment process around those assets. It is not essential to start with the

assets, but we find that it is an effective approach. In particular, we believe that it helps focus the process on achievement of outcomes.

Step 1 of INFFER consists of developing a list of natural assets for the relevant region/state. Only significant or important assets should be included on the list. Most items on the list will not remain on the list of priorities produced by the INFFER process. The list will be subjected to filtering in step 2, and remaining items will be comprehensively assessed in step 3.

Note: In many regions, theme-based or threat-based strategies have been developed; e.g. accredited sub strategies for river health and native vegetation, Salinity Management Plans, Pest Plant and Animal Plans. These plans recognise assets at some level. The key difference with INFFER is that it starts by identifying the assets and then asks which threats are relevant, rather than focussing attention on a specific threat.

Developing a list of significant assets can be done in a variety of ways including:

- Community workshops across a region where people nominate assets, places, or other bio-physical things of significance to them and their communities. From our experience this may involve 5 – 15 geographically based workshops across a region.

- Technical specialists generate spatially explicit maps that represent their view of significant assets. The technical specialists could be from the organisation conducting the process, or from other relevant bodies, such as state agencies or research organisations.

- Compiling a list of assets from existing documentation such as national, state and regional inventories.

Ideally, all of the above methods would be used in tandem to develop an agreed list of significant regional assets. Typically this will result in several hundred assets being identified (200 – 400 from our experience). There are risks in only relying on one or two of the methods. For example using the last two methods above usually results in assets on public land being identified, missing key assets on private land.

What is an asset?

An asset is the thing we hope to protect or enhance through a proposed project. It could be large or small, degraded or pristine, localised or dispersed. An asset could be a single localised thing (for example, a particular wetland or stretch of river), or it could be a collection of smaller assets, such as remnant vegetation on farms in a region, or agricultural land in a region. An asset could be defined to be very large (e.g., Murray River, Great Barrier Reef). However, if this is done, it is unlikely that the available funding will be sufficient to manage it, unless the goal specified for the asset is very modest. (See Appendix 1.)

Many tools, models and frameworks have been developed to assist with the spatial targeting and prioritisation of environmental investments. (See Wintle (2008) for an overview of the main tools and models in use in Australia.) We have found that the available tools are not sufficiently comprehensive in the range of criteria that they consider to be sufficient for the whole prioritisation process, but they can be suitable for steps 1 and 2 of INFFER (asset identification and initial filtering).

To be suitable for analysis using INFFER, an asset needs to meet these requirements:

- The asset must be fundamentally biological/ecological/physical in nature;
- It must be spatially delineated (single or multiple components can be mapped);
- It must be possible to specify a "SMART" (Specific, Measurable, Achievable, Relevant and Time-bound) goal for the asset.

Key elements of our approach to asset definition are:

- Recognition that asset identification is in part a social process that involves consideration of the ecological, social, cultural and economic values from a range of perspectives e.g. scientific experts and "the community"
- Differentiation between the asset itself and the spatial extent of threatening processes operating on the asset. The framework acknowledges that threats may operate proximate to the asset or at some distance.

INFFER does not:

- Treat ecological processes associated with landscapes or ecosystem services provided by nature as assets. It does, however, recognise they these services may generate benefits for the biological/ecological/physical assets.
- Treat people or the community as an asset. Again, it is recognised that the community plays a number of crucial roles in the process. See Appendix 1.

How to do step 1 well – key things to consider

When asking people about significant assets, it is important that existing views of priorities are excluded. For example using maps with "expert" views of priorities (e.g., conservation significance of habitat) may disenfranchise participants in the process, leaving them feeling that decisions have already been made and that their input is tokenistic.

- Don't rely solely on spatial data and/or modelled layers – issues with accuracy and appropriate use of this data can mean that the outputs fail to match on-ground reality.
- Be clear about what is meant by an asset for the purposes of this process (see above).
- Be clear about how you are going to use the list of assets once you have collected the information. It is important to explain to people involved how their information will be used in subsequent steps in the INFFER process. For example it is crucial to make it clear that just because an asset gets on the list, this does not mean that it will be a priority for public investment.
- Think carefully about how your organisation will record, analyse and report on the outcomes from this step. The INFFER team has developed examples of mapping products, databases and analytical methods that you could draw on to help you.
- Ensure that assets are defined spatially, including specification of their boundaries. It is not sufficient to identify the location of an asset as a point on the map. If boundaries are not specified at this point, they will need to be specified later, which will be more difficult and risks ignoring important local knowledge.

- Careful facilitation is essential to ensure that participants are clear about the process, all views are included and that participants are made to feel that their input is welcome – as long as they are a spatially defined natural asset, pretty much all proposed inclusions on the list should be accepted at this stage. It is important that facilitators have a good understanding of INFFER before attempting an asset identification workshop.

- Don't rush the process – ensure that participants have adequate time to understand what they are being asked to do and why.

The Step-by-Step guide on page 8 provides additional guidance in identifying significant assets.

Asset categories

The identification and selection of assets using INFFER can be applied at a range of scales from continental, state, regional to local. The focus of this paper is on application at regional scale with particular reference to the incorporation of national and state priorities and local community knowledge. Our experience with the regional application of INFFER suggests that the broad categories of assets shown in Table 2 are generally applicable.

Table 2: Suggested asset categories

Asset categories	**Description of the asset**
Rivers	Usually defined as individual river reaches although this is not essential
Wetlands	May include associated floodplain ecosystems
Marine	Estuaries, coastal areas, reefs
Aquifers	High-value groundwater systems or aquifers
Water resources	Water quality in waterways or storages
Significant species	Known point locations of threatened/significant species or mapped critical habitat for selected species
Native vegetation/habitat	This may be defined as broad habitat groups or specific ecological communities
Cultural assets	Sites of indigenous or European cultural heritage
Soils or agricultural land	Selected geographic areas of agricultural land or specific soil types

Asset scale

As highlighted above, INFFER can be applied to assets of any size, arrangement and scale. For very large assets (e.g. Gippsland Lakes, Great Barrier Reef), users may find it relatively difficult to define a "SMART" (Specific, Measurable, Achievable, Relevant and Time-bound) goal. For such large assets, the magnitude of interventions required to maintain asset condition, let alone improve it, is likely to be extremely large, and may be beyond the available resources.

A practical alternative with very large assets may be to focus a project on part of the asset. The part may be defined geographically (e.g. that part of the Great Barrier Reef affected by runoff from the Burdekin catchment) or biologically (e.g. the sea grass communities within a large marine asset). Within INFFER, this focusing can be achieved in one of two ways: (a) by defining the asset to be that part of the asset, rather than the whole asset (more likely to be relevant where the part is defined geographically) or (b) by specifying a goal for the asset that is modest enough to be feasible with the available resources.

Asset significance

The assets identified in step 1 of the INFFER process should be significant assets. Asset significance is only one of a number of criteria used to prioritise assets in the full process, but at step 1 it is the main issue considered. “Significance” encompasses environmental (ecological), social/community and economic values. For example, the ecological value of an asset might be decided upon on the basis of criteria such as rarity, diversity, contribution to broad ecological function, condition/naturalness or other criteria which are important. Social/community value criteria might relate to aesthetics, recreation, cultural heritage, education or science. Economic value may relate to financial benefits and risk management.

INFFER focuses on significant assets of high to exceptional value. Working with regional bodies and state agencies across Australia, we have been exposed to a range of processes and tools for determining asset significance. Some of these are included in Table 3. The descriptions provided in Table 3 don’t cover all asset categories as in some cases there is no clear and agreed methodology for determining significance or there is no consistent approach across states and territories. If there are agreed methods for assessing asset significance, these can be used.

Combining assets

There are often cases where assets from different asset categories are located close together. For example, an important reach of a river may be close to a wetland complex that includes native vegetation or critical habitat. In these situations it may be appropriate to combine these elements into one asset for the purposed of INFFER, especially if the threats operating are the same or very similar.

Another example where combining discrete assets may be appropriate would be where individual taxa with similar ecological requirements (e.g. geophytic orchids) are distributed at point locations across a landscape or region. Again if the same or very similar threats are operating it may be useful to combine them for detailed analysis using INFFER.

Table 3. Determination of asset significance.

Asset category	**How is significance determined?**	**Notes**
Rivers	There are no nationally agreed criteria for the rating the significance of rivers. See useful article by Professor Richard Kingsford http://www.science.unsw.edu.au/opinion-australian-heritage-rivers/ In various state jurisdictions categories such as "heritage river" and "representative river" (Victoria), "wild rivers (NSW & Qld) have been developed to signify that some rivers or parts of rivers are especially significant. River systems are generally divided into a series of river reaches for assessment of condition and prioritisation.	AUSRIVAS (**Aus**tralian **Riv**er **A**ssessment **S**ystem) is a rapid prediction system used to assess the biological health of Australian rivers. AUSRIVAS has two streams, **Bioassessment** and **Physical assessment**. These correspond with rapid biological assessment protocols and rapid geomorphic, physical and chemical assessment protocols respectively. In Victoria the Index of Stream Condition is used to score river reaches in terms of their biological and physical condition in relation to benchmark states. The RiVERS (River Values and Environmental Risk System) database has been used to assign scores that quantify environmental, social and economic values and threats. Similar systems and approaches have been developed in other states (e.g. River Styles in NSW http://www.riverstyles.com/index.php).
Wetlands	Assignment according to a hierarchical set of categories: • Ramsar sites of international importance (listed under the Convention on Wetlands also known as the Ramsar Convention.) • Wetlands of national importance (as listed and described in the third edition of the Directory of Important Wetlands in Australia). • Wetlands of bioregional significance (Significant subregional wetlands as identified by the National Land and Water Resources Audit (NLWRA)) • Wetlands of local significance	The Index of Wetland Condition (IWC) has been developed in Victoria (for naturally occurring wetlands without marine hydrological influence). Wetland condition has been defined for the IWC as the state of the 'biological, physical, and chemical components of the wetland ecosystem and their interactions'. The definition is based on the Ramsar Convention definition of ecological character. The IWC is designed for the general surveillance of wetland condition. It is designed to be useful for assigning wetlands to general condition categories and detecting significant changes in wetland condition.

Significant species	Nationally threatened species under the EPBC (Environment Protection and Biodiversity Conservation) Act http://www.environment.gov.au/epbc may be classified as critically endangered, endangered, vulnerable and conservation dependent. Similar hierarchies exist at a state level. In Victoria significant species are listed under the FFG (Flora and Fauna Guarantee) Act as critically endangered, endangered, vulnerable or lower risk/near threatened.	Generally this category relates to threatened species although in certain cases significant species may be focal, umbrella, indicator, keystone, iconic or flagship species which represent a range of ecological or socio-cultural values. These categories relate to the conservation status of species In many cases the precise location of significant species is poorly known and in these cases or for mobile species such as birds or mammals it is preferable to represent their preferred or critical habitat
Native Vegetation/habitat	As for significant species, native vegetation or habitat may be classified according to the conservation status of particular ecological communities. At a national level and listed under the EPBC Act the same categories of critically endangered and endangered are applied to ecological communities. At a state level in Victoria vegetation communities, known as Ecological Vegetation Classes (EVCs), may be assigned these conservation statuses: endangered, vulnerable, depleted, rare or least concern. The assignment of a status is based on criteria such as degree of depletion, level of threat and overall loss of quality. In addition the conservation significance of individual patches (any size) of native vegetation may be ranked as very high, high, medium and low according to a combination of conservation status, habitat score/quality, occurrence of threatened species or other attributes (e.g. National Estate values, JAMBA/CAMBA, drought refuges, etc.).	Identification of native vegetation/habitat assets may take a variety of forms. For example it could be: • All remnants of an endangered ecological community across a catchment or bioregion; • As above with a minimum habitat quality threshold specified to exclude patches in poor condition; • All remnants of very high conservation significance (which may include different ecological communities) across a catchment, bioregion or local landscape; or • Remnant patches of specified ecological communities that represent critical habitat for significant threatened species (e.g. patches of old-growth Yellow Gum vegetation as critical habitat for the endangered Swift Parrot). Questions of land tenure could be useful or confounding. For example, an identified asset may be a particular National Park or combination of public and private land in the landscape of special significance where the same or very similar threats are operating on the asset.

Combining expert and community knowledge

INFFER recognises the value of formal and tacit knowledge in the identification of assets. In the asset identification phase, all relevant scientific and ecological knowledge should be collated and represented spatially. This information can be drawn from journal papers, investigations and reports and spatial data layers. In the case of spatial data, clear metadata information is important in understanding issues such as scale-related limitations and methodologies for deriving and assigning significance.

Our experience in applying INFFER has shown that local community knowledge is very valuable for a number of reasons including:

- Identification of significant assets that are unknown/poorly understood by regional organisations, state and federal agencies;
- Formation of a broad view of the values associated with assets; and
- Information on current condition, trend and threats.

Asset identification provides an important opportunity to involve local and regional communities in natural resource management decision making. Recognising and valuing local knowledge is also more likely to make the recommendations developed by INFFER more transparent and trusted. Important local knowledge may be gathered through encouraging participation by farmers, Landcare groups, extension officers and field naturalists in the INFFER process.

Step-by-step guide

1. Generate a high quality base map of the landscape under consideration

This could be a whole NRM region, catchment or bioregion. Aerial photography or satellite imagery is ideal if available.

The base map should include major waterways, wetlands and native vegetation. It can be useful (but not essential) at technical specialist workshops to have additional maps of:

- Key threatened species locations (and their critical habitat if these data are available);
- Public and private land; and
- Soils, high capability agricultural land.

2. Identify the spatial locations of assets

The base map from Step 1 can be used in a facilitated community workshop session involving local people with landscape knowledge. The workshop can also include regional experts such as ecologists, extension officers, and representatives of NGOs. Alternatively (or in addition) the experts can be asked separately (see step 3).

It can be useful to have “live” GIS data available for this step although standing around the map with a marker pen and Post-It notes works well. Participants are asked to identify significant assets. These are marked on the map. The facilitator draws out local and expert

knowledge of those present. This information (e.g. about condition, values and threats) is captured and recorded on an Asset Documentation Sheet (Appendix 2) for each asset identified.

When marking assets on the map, include an indication of their boundaries, not just their location as a point on the map. This forces people to think more critically and more specifically about what the asset really is. Also, it is required information for subsequent steps of INFFER, and the workshop is the most convenient and the most appropriate time to define the boundary, at least as a first cut. If boundaries are not specified at this point, they will need to be specified later, which will be more difficult and risks ignoring important local knowledge.

We suggest that assets are identified using the categories in Table 2

- Rivers: River reaches classified according to their significance, value or priority;
- Wetlands: Ramsar, wetlands of national importance, bioregionally significant wetlands;
- Marine: Estuaries, coastal areas, reefs
- Aquifers: High value groundwater systems or aquifers;
- Water resources: places such as water supply catchments and storages where water quality is important;
- Significant species: Known point locations of threatened/significant species or mapped critical habitat for selected species;
- Native vegetation/habitat: Conservation status and/or conservation significance of remnant vegetation;
- Cultural assets: Sites of indigenous or European cultural heritage
- Soils or agricultural land: Selected geographic areas of agricultural land or specific soil types
- Clusters of the above assets if appropriate.

3. Ask regional and state experts to identify their highest-value assets

Ask them to specify the “top 10” or “top 20” for each of the above asset categories in a spatially explicit manner on the base map. That is, the 10 or 20 most significant river reaches, wetlands, etc. Even if the experts have participated in a broader workshop as outlined in step 1, they should additionally generate their “top” list to ensure that available knowledge is fully captured and documented as part of the process. This helps with discussions later if there are questions asked about why a particular listed asset was left off the priority list.

An alternative (or complementary) approach to this step is to use a systematic conservation planning approach to the identification of key environmental assets. For example, spatial data analysis can be used to identify parcels of native vegetation that satisfy a combination of ecological criteria.

4. Combine the expert-generated and community-generated lists and examine for consistency and differences

In some cases, the highest value assets might not be on state lists (e.g. most likely if these are located on private land). In other cases, assets that appear on state lists might be validly discarded from further assessment on the basis of local knowledge. For example local communities may know that a particular asset is in poor condition compared with other similar assets.

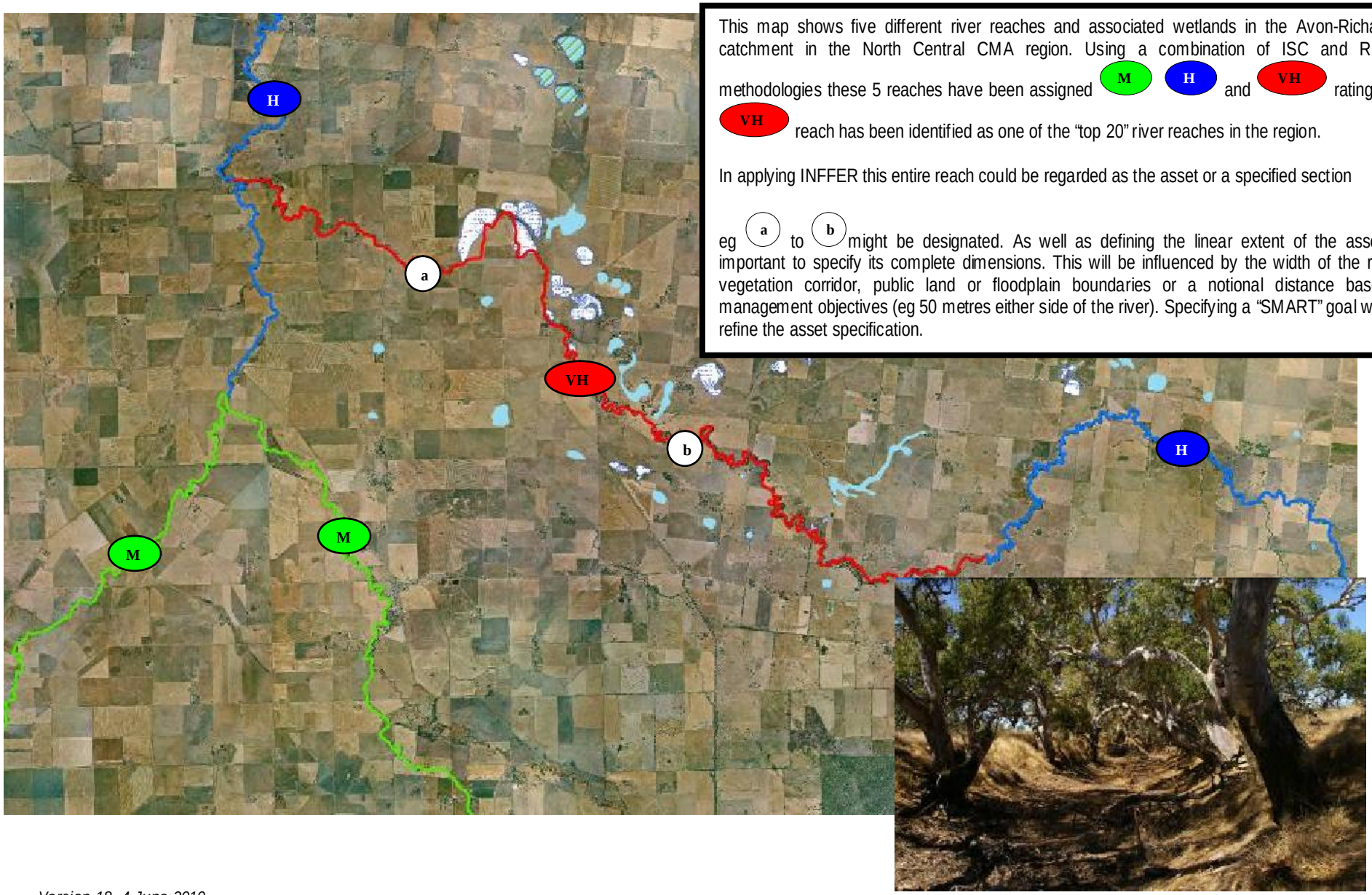
5. Proceed to next step of the INFFER process

See the document “Overview of the INFFER Process” for brief information about the next step, and the document “Filtering Significant Assets Prior to Detailed Assessment” for detailed information.

Example asset maps

On the following pages are five examples to help illustrate what an asset map might look like for five types of assets: rivers, wetlands, native vegetation/habitat, threatened species and a combination assets consisting of several elements of different types.

Example 1: What might an asset map look like for rivers?

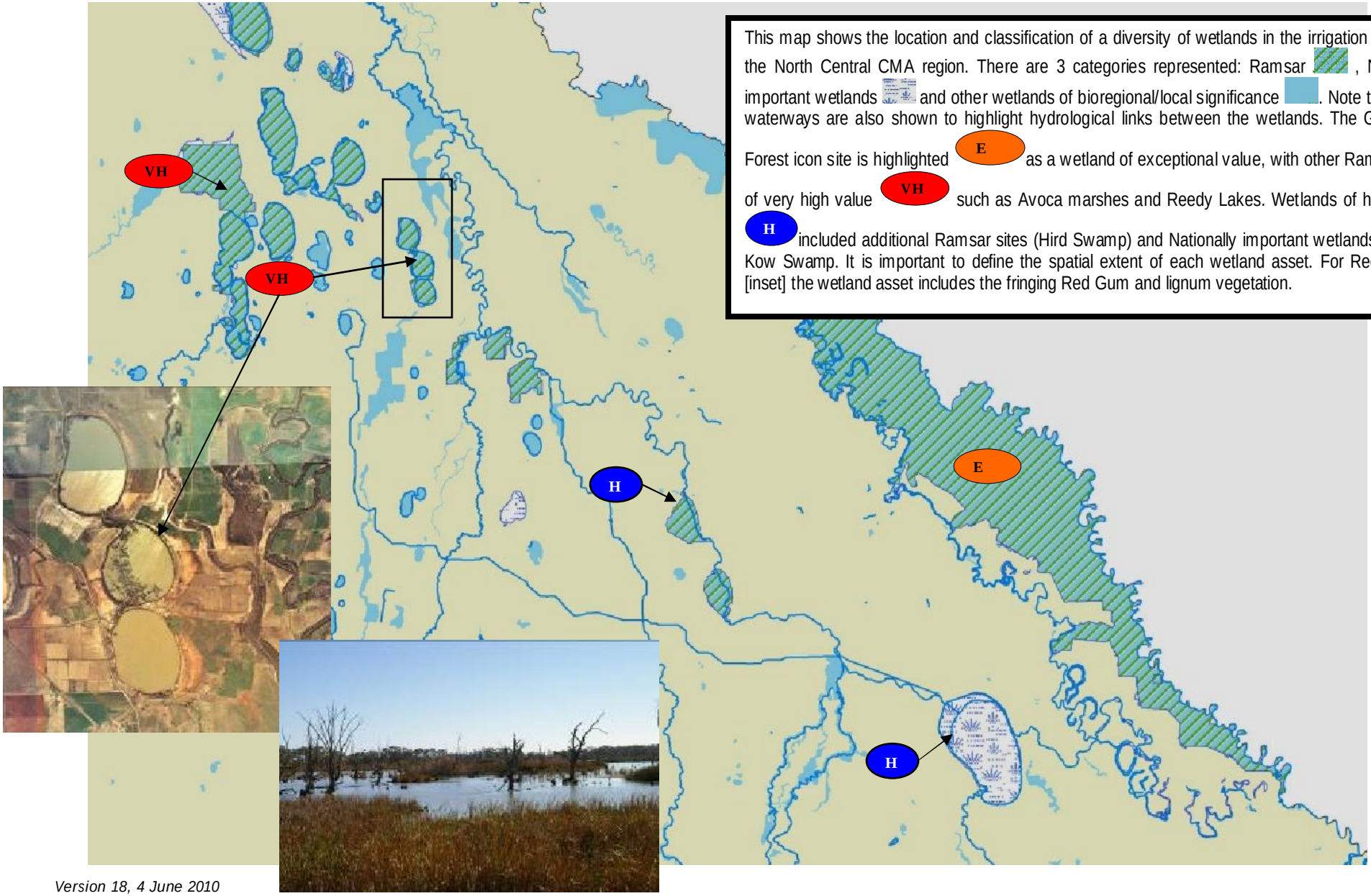


This map shows five different river reaches and associated wetlands in the Avon-Richardson catchment in the North Central CMA region. Using a combination of ISC and RiVERS methodologies these 5 reaches have been assigned M H and VH ratings. The VH reach has been identified as one of the "top 20" river reaches in the region.

In applying INFFER this entire reach could be regarded as the asset or a specified section

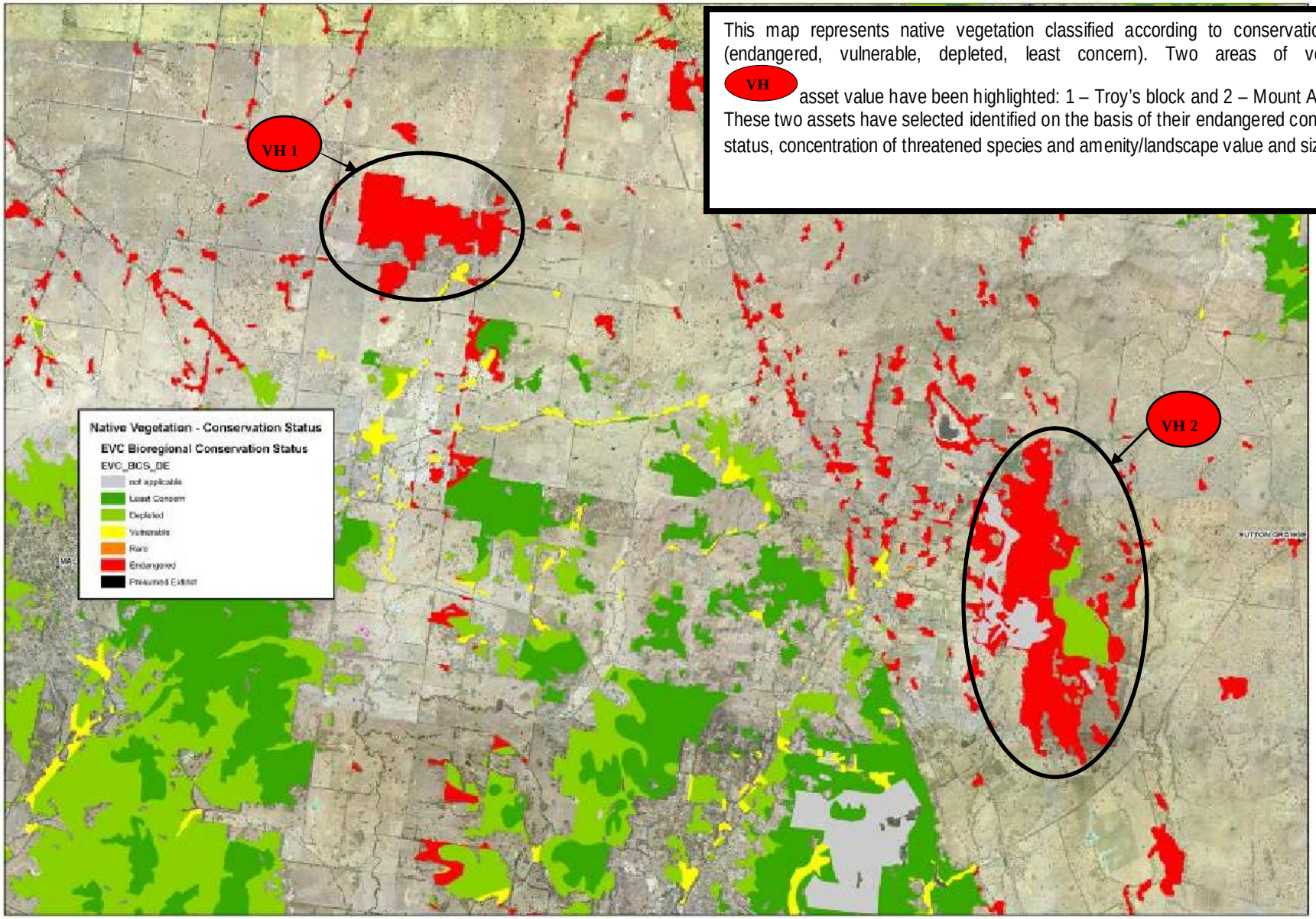
eg a to b might be designated. As well as defining the linear extent of the asset it is important to specify its complete dimensions. This will be influenced by the width of the riparian vegetation corridor, public land or floodplain boundaries or a notional distance based on management objectives (eg 50 metres either side of the river). Specifying a "SMART" goal will help refine the asset specification.

Example 2: What might an asset map look like for wetlands?



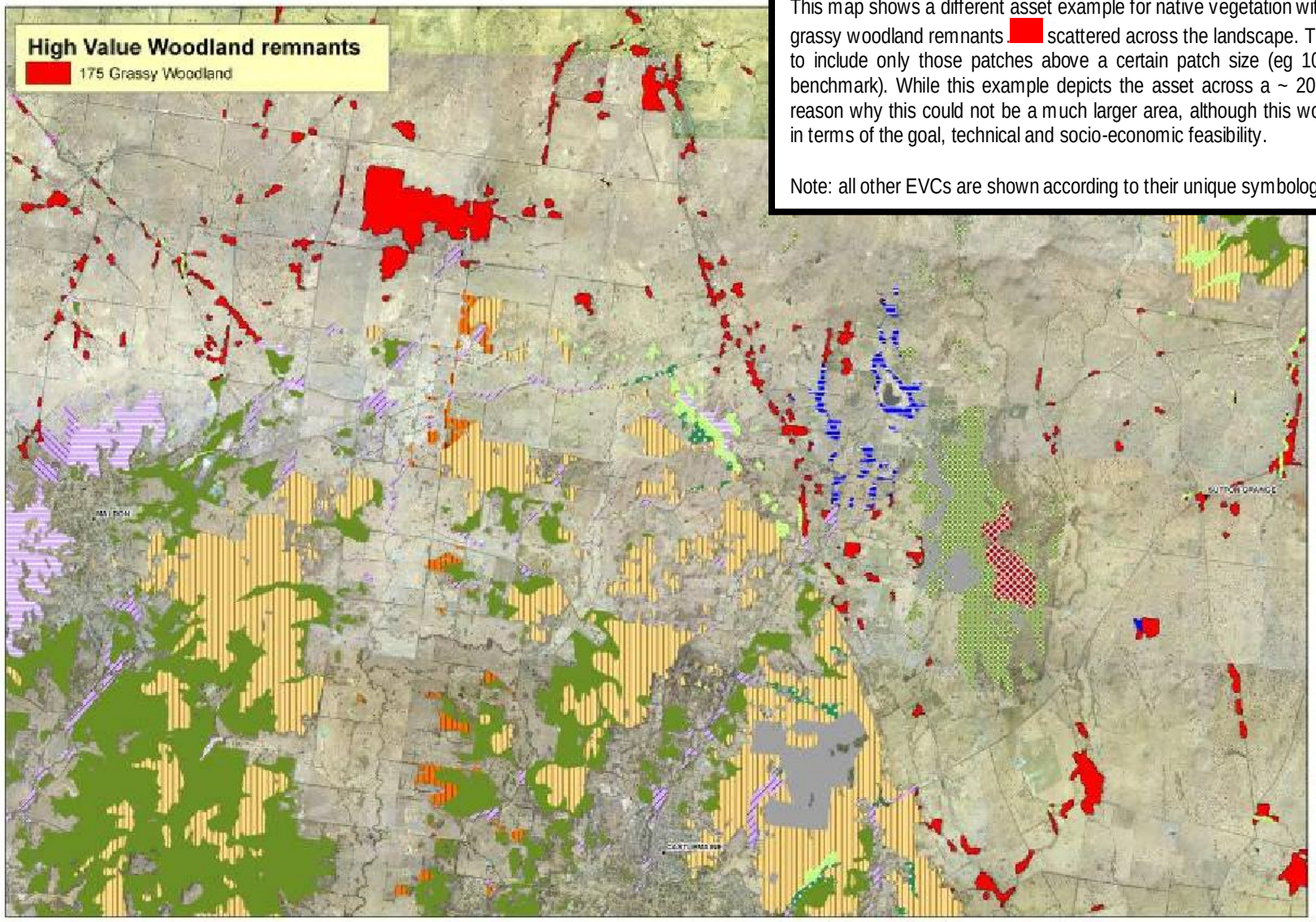
This map shows the location and classification of a diversity of wetlands in the irrigation region of the North Central CMA region. There are 3 categories represented: Ramsar , Nationally important wetlands and other wetlands of bioregional/local significance . Note that some waterways are also shown to highlight hydrological links between the wetlands. The Gunbower Forest icon site is highlighted E as a wetland of exceptional value, with other Ramsar sites of very high value VH such as Avoca marshes and Reedy Lakes. Wetlands of high value H included additional Ramsar sites (Hird Swamp) and Nationally important wetlands such as Kow Swamp. It is important to define the spatial extent of each wetland asset. For Reedy Lake [inset] the wetland asset includes the fringing Red Gum and lignum vegetation.

Example 3a: What might an asset map look like for native vegetation/habitat?



This map represents native vegetation classified according to conservation status (endangered, vulnerable, depleted, least concern). Two areas of very high VH asset value have been highlighted: 1 – Troy's block and 2 – Mount Alexander. These two assets have selected identified on the basis of their endangered conservation status, concentration of threatened species and amenity/landscape value and size.

Example 3b: What might an asset map look like for native vegetation/habitat

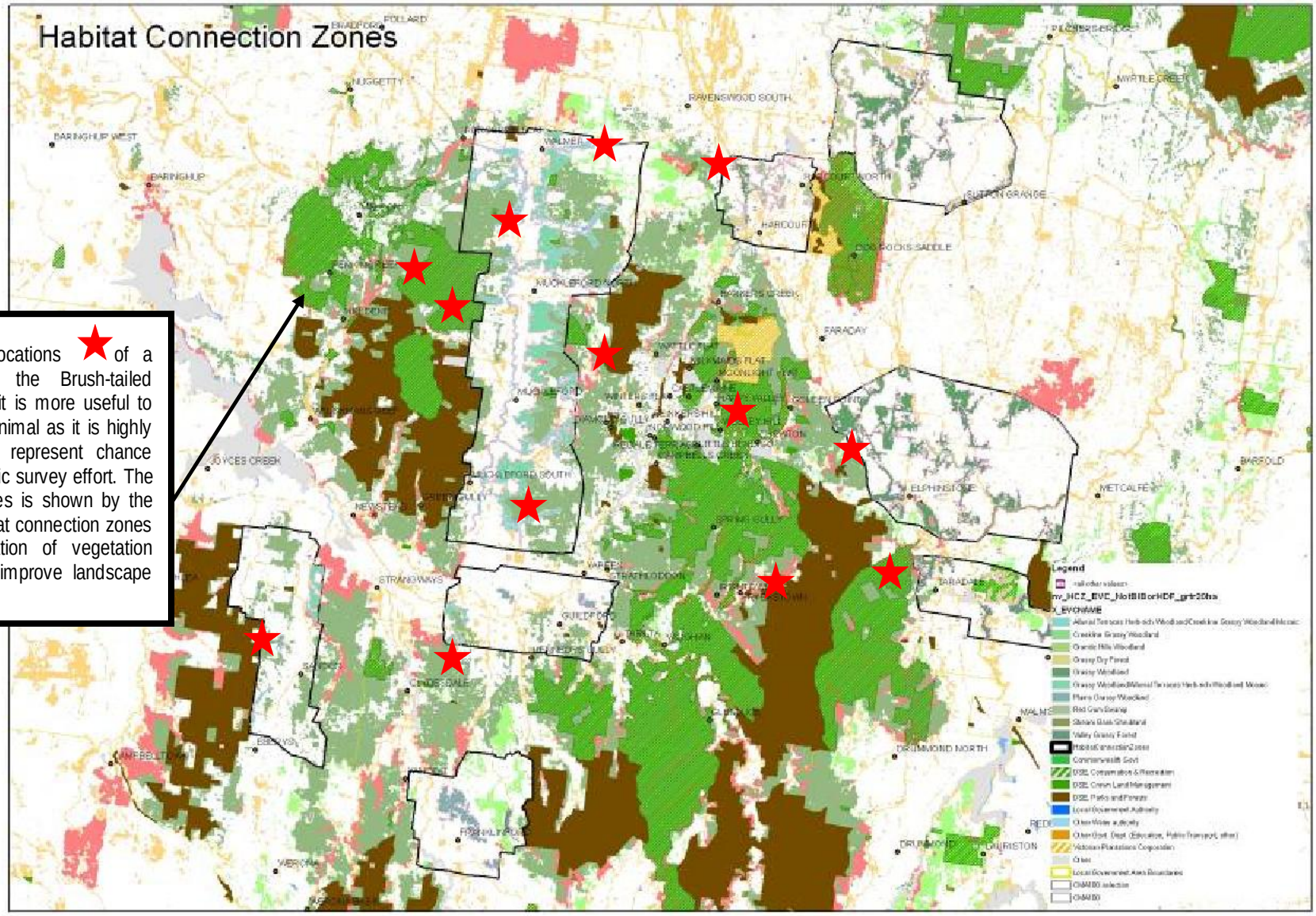


This map shows a different asset example for native vegetation with high conservation significance grassy woodland remnants scattered across the landscape. The asset could be further refined to include only those patches above a certain patch size (eg 10 ha) and quality (eg > 30% of benchmark). While this example depicts the asset across a ~ 20 x 20 km landscape there is no reason why this could not be a much larger area, although this would obviously alter the analysis in terms of the goal, technical and socio-economic feasibility.

Note: all other EVCs are shown according to their unique symbology.

Example 4: What might an asset map look like for threatened species

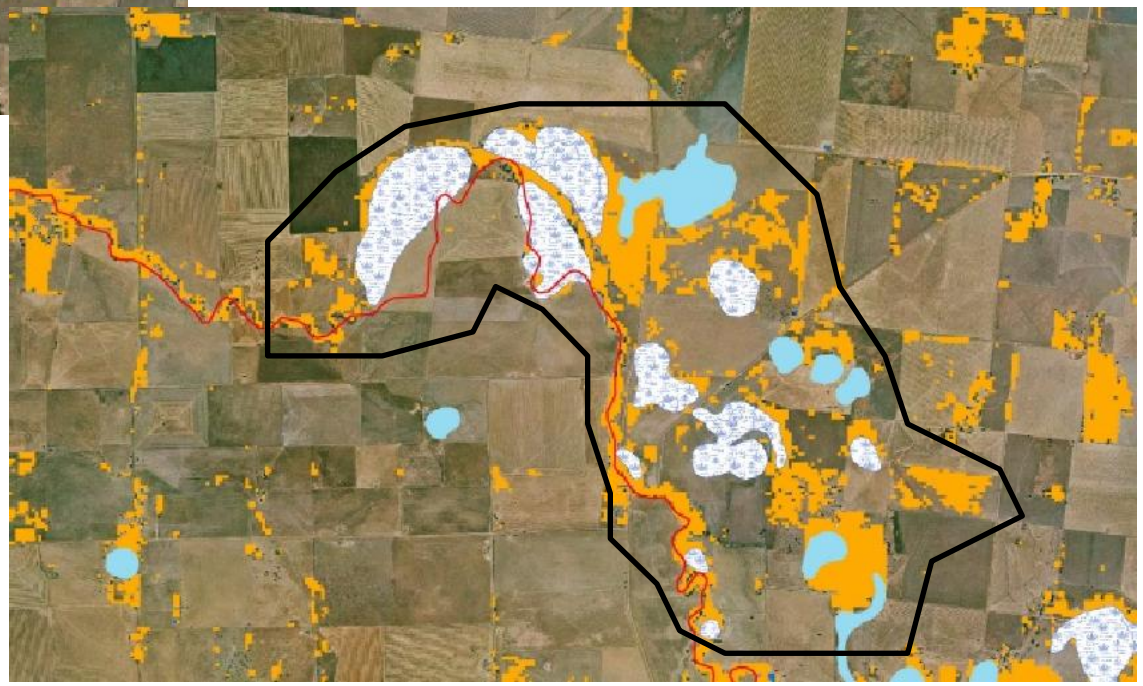
This map shows the known locations ★ of a significant threatened species, the Brush-tailed Phascogale (Tuan). In this case it is more useful to define the critical habitat of the animal as it is highly mobile and its known locations represent chance observations rather than systematic survey effort. The critical habitat map for the species is shown by the bold coloured areas with the habitat connection zones representing the proposed location of vegetation management works required to improve landscape connectivity for the species



Example 5: Combining assets – York Plains example

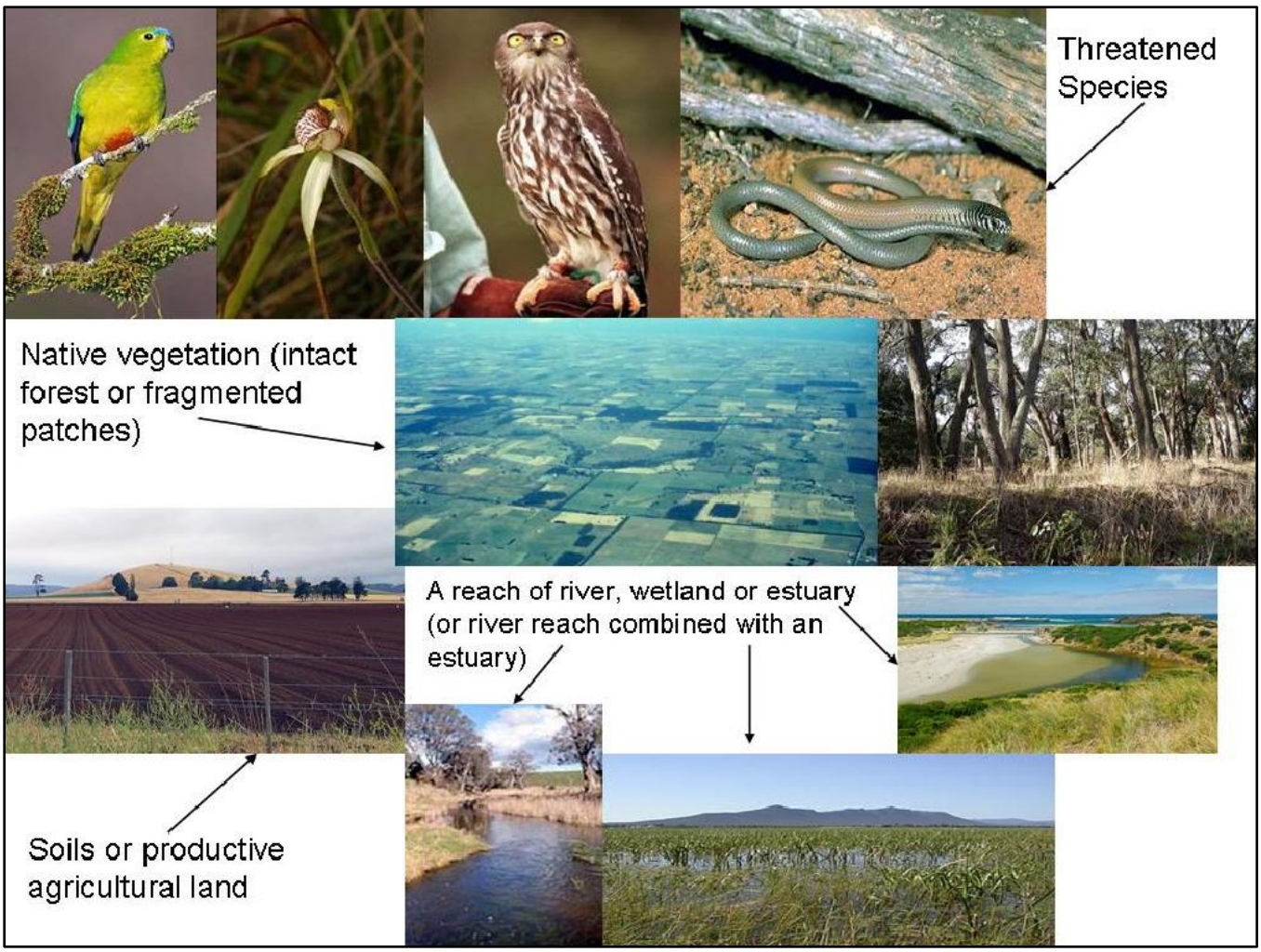
This map shows how assets of different categories may be combined for INFFER analysis. In the symbolized aerial photograph below a section of the Avon River, together with a series of wetlands and patches of very high conservation significance native vegetation are represented. Together they make up the York Plains wetland complex which has been analysed as a combined asset.

Each of the asset entities alone may not have been considered of very high value but as the system is interconnected, dependent upon similar ecological processes and facing similar threats the York Plains wetland complex was deemed a priority



Asset Profiles

Examples of environmental assets suitable for INFFER assessment



The examples presented in this section draw on our experience with the application of INFFER to a range of asset categories. Not all categories are covered but those provided are intended to provide a clear sense of how INFFER deals with a diversity of situations.

Asset Profile 1: Kerang Wetlands

Type of Asset: Wetland Complex

Location of Asset: The Kerang wetlands system is located ~300km northwest of Melbourne, along the western edge of the Riverine Plain in the Loddon-Murray Region (DSE 2004).

Brief Description of Asset: The Kerang wetlands complex forms an extensive system of over 100 wetlands. The asset area is ~9,419ha (Figure 1), which is the Ramsar listed section of the system (DSE 2004). The system consists of a combination of permanent and temporary wetlands including; permanent freshwater lagoons, permanent open freshwater lakes, deep freshwater marshes, and saline/ hypersaline lakes (DSE 2004).

The Kerang wetlands are recognised for their representativeness of Victorian wetlands, flora and fauna values and for the system's significance as habitat for a large abundance and diversity of waterbirds (DSE 2004). A number of Aboriginal sites are found within Kerang wetlands including: mounds, scarred trees, middens, burials, hearths, surface scatters and isolated artefacts (DSE 2004). Kerang wetlands are also locally important for recreation and tourism (DSE 2004). The system is used for agricultural irrigation purposes (DSE 2004).

Kerang wetlands occur over both public and private land. The surrounding private land is mainly utilised for agricultural purposes, irrigated grazing, horticulture, dairy farms, dryland grazing and cropping. The township of Kerang is situated adjacent to the wetland system (DSE 2004). A number of threats affecting the system have been identified: altered water regimes, salinity, pollution, pest plants and animals, resource utilisation, recreation, erosion, dredging, fire and inappropriate land use/management (DSE 2004).

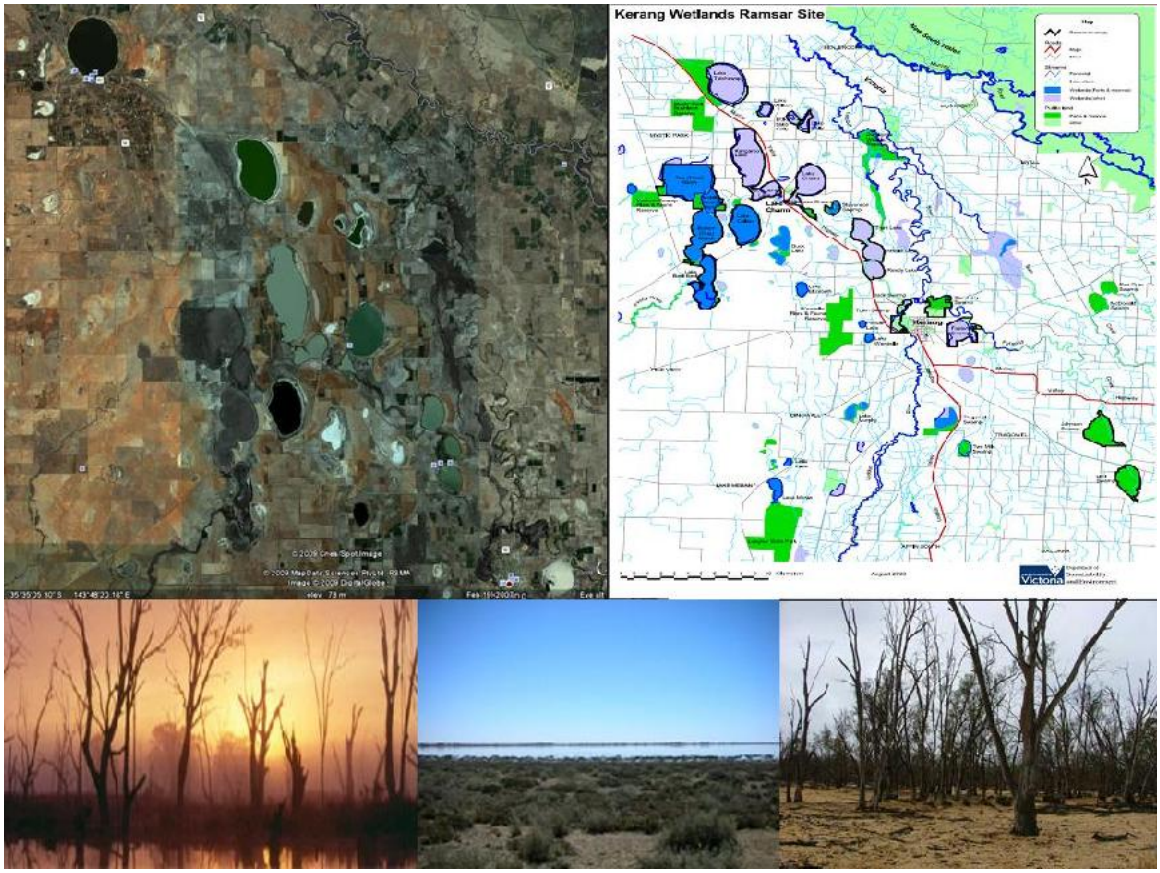


Figure 1: *Different representations of Kerang wetlands. The top right image is good example of a large asset that is spread across the landscape but is still spatially explicit.*

Asset Profile 2: Brush-tailed Phascogale or Tuan

Type of Asset: Threatened Species

Location of Asset: Mt. Alexander Shire, Central Victoria

Brief Description of Asset: The asset is the Brush-tailed Phascogale (*Phascogale tapoatafa*) population across Mt. Alexander Shire in Central Victoria (Figure 2). The Brush-tailed Phascogale (BTP) is a nocturnal, predominantly carnivorous, arboreal marsupial about the size of an average rat (Costanzo and Pescott 2006). The BTP is found across a variety of treed habitats, preferring areas with large old trees which provide suitable nesting sites and dry forest with little ground-cover (Costanzo and Pescott 2006). Home ranges for females are about 30-60 ha whilst for males home ranges are over 100 ha. Unrelated females are unlikely to overlap home ranges. However, male home ranges overlap extensively (Traill and Coates 1993; Soderquist1995).

The BTP is an iconic species recognised by the community. The BTP has value as a focal species where many of the threats to the BTP also impact a suite of other species (e.g. Swift parrot, Barking owl, Powerful owl, Painted Honeyeater, Victorian Woodland Bird Community). The BTP habitat is also a place of community significance in Mt. Alexander Shire, providing an area that is utilised for nature walking and bird watching. The BTP is listed as threatened under schedule 2 of the FFG Act 1988.

The main risks to BTP populations in the Mt. Alexander Shire include: land clearance for agriculture reducing available habitat for foraging and nesting and increasing the exposure of the BTP to predation from both native and introduced species (cats and dogs).

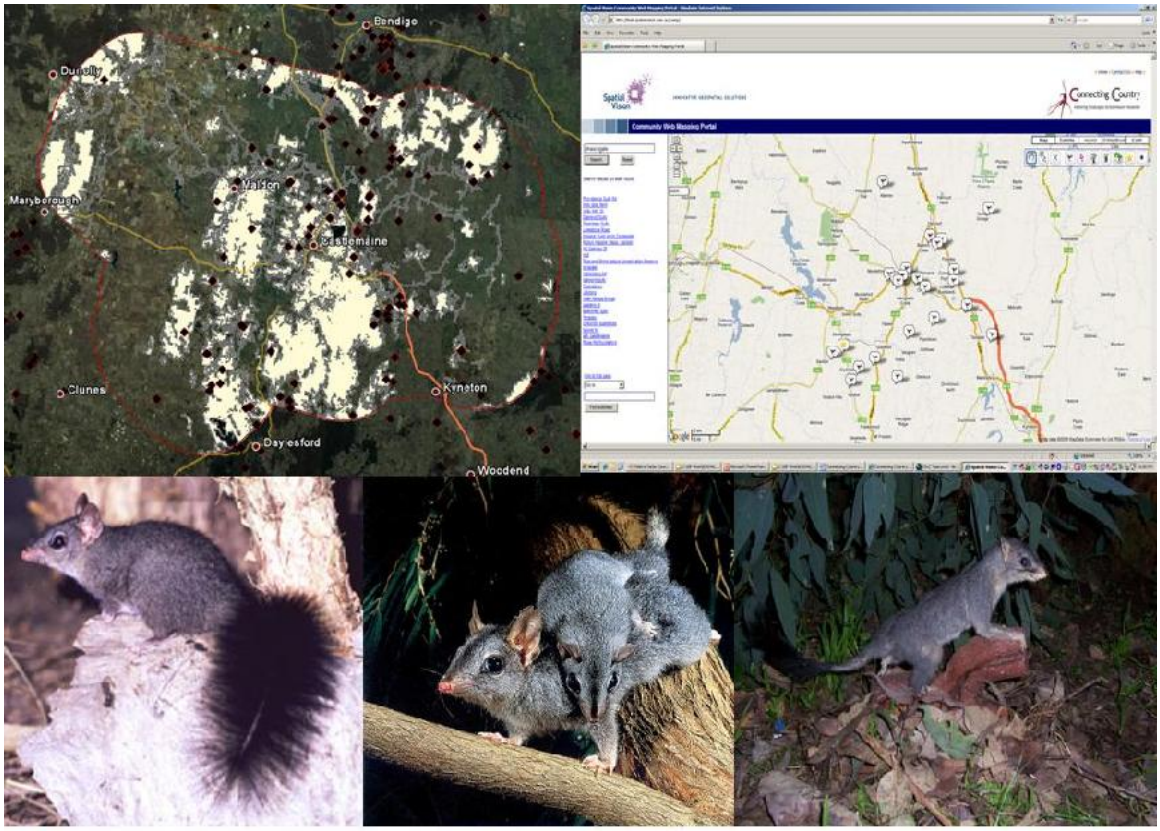


Figure 2: *The two top images indicate the species distribution. The top-left image, represents suitable habitat and the top-right image shows sightings from a community portal. The bottom images illustrate the Brush-tailed phascogale in action.*

Asset Profile 3: Southern Tableland Grassy Woodland

Type of Asset: Native Vegetation Community

Location of Asset: Southern and Central Tablelands from Sofala to Orange in NSW

Brief Description of Asset: The Southern Tableland Grassy Woodland of NSW (Figure 3) is composed of open eucalypt woodland (10-15 m high), with a sparse non-sclerophyll shrub stratum and a continuous cover of grasses and herbs (Thomas *et al* 2000). The grassy woodland community supports a large diversity of trees, shrubs, forbs and grasses. (For further detail see http://www.threatenedspecies.environment.nsw.gov.au).The Southern Tableland Grassy Woodland is listed as endangered under the EPBC Act 1999 and supports a number of species that are listed and conserved under international, national and state legislation. (For more detail see http://www.environment.gov.au/biodiversity/threatened/communities/natural-temperate-grasslands.html).

This Grassy Woodland ecosystem has been modified by pastoral and agricultural activities since the 1830s, resulting in a decline in condition and extent. This has resulted in fragmentation of the Grassy Woodland community across the landscape. Past disturbances/threats resulting in decline of condition and extent of this community include: grazing, fertilizer application, inappropriate fire regimes, vegetation clearance, and rural and urban development (Benson & Wyse Jackson 1994; Endangered Species Scientific Subcommittee 2000). Currently, clearing and inappropriate or inadequate land management practices represent the major threats to this system (Endangered Species Scientific Subcommittee 2000). Southern Tablelands Grassy Woodland remnants occur over both private and public land.

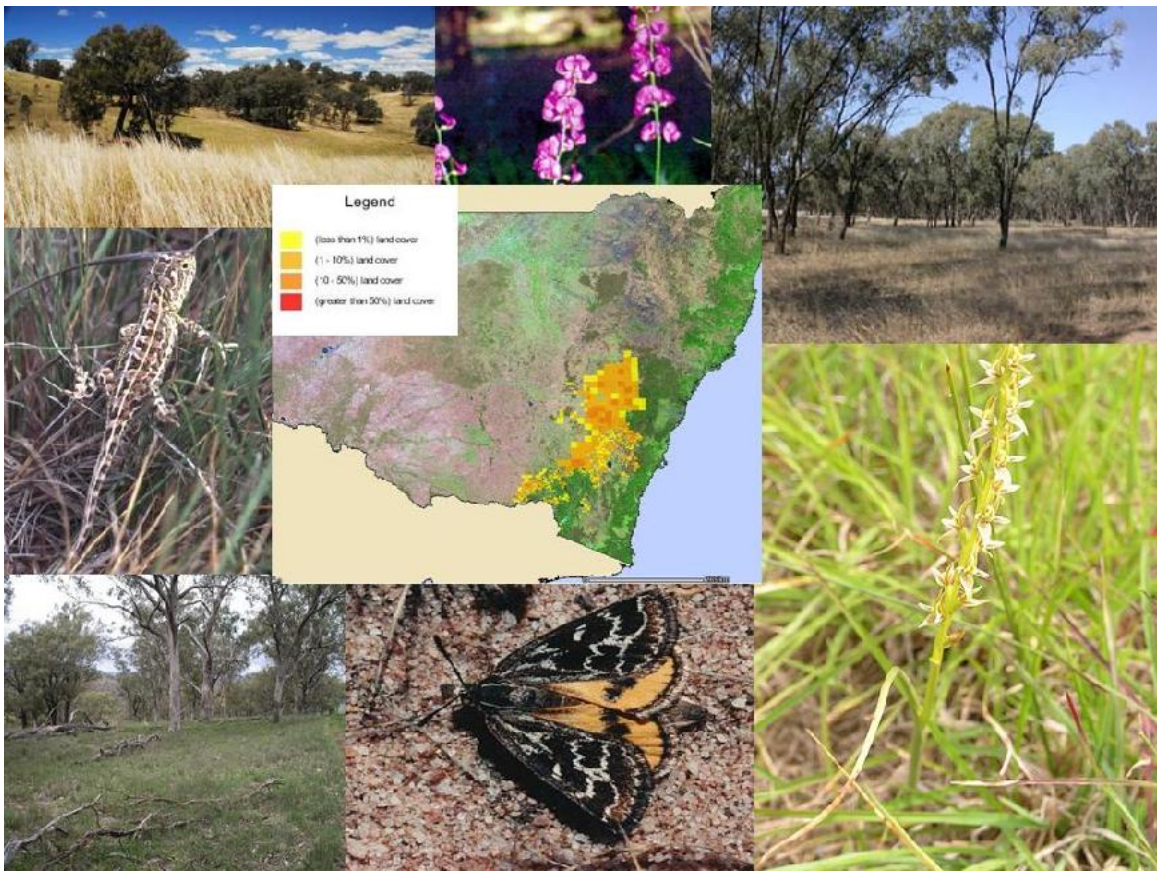


Figure 3: *The Southern Tableland Grassy Woodlands are a threatened ecological community, supporting a suite of species. The map in the middle indicates the distribution (based on land cover) of the grassy woodland community. The asset could be defined as the most degraded patches (least land cover).*

Asset Profile 4: Merri Estuary and Merri River - Reach 38

Type of Asset: Estuary/ River complex

Location of Asset: West of Warrnambool, ~300km Southwest of Melbourne, Victoria.

Brief Description of Asset: The Merri Estuary system as defined here is bounded to the east by Pickering point and to the west by Rutledges cutting and includes a stretch of the lower Merri River (Figure 4). The river component includes the area in which the river enters the estuary to 15 km upstream, defined as reach 38 in the Glenelg Hopkins CMA River Health Strategy. (See map insert to Figure 4).

The Merri Estuary system includes Kellys and Saltwater swamps, which are nationally important wetlands. They provide important habitat that supports the rare Orange Bellied Parrot (*Neophema crysogaster*), listed under the EPBC Act 1999 and the FFG Act 1988, as well as providing significant breeding grounds for the Hooded Plover (*Thinornis rubricollis*), which is listed under the FFG Act 1988. The swamps also provide important nesting sites for other ground nesting birds. Seagrass beds are present throughout the estuary and are known to be important nursery sites for juvenile fish species and other marine and freshwater species (GHCMA 2008). The Merri Estuary system is a popular area for recreational fishing and other water-based activities, such as boating, swimming and non-water based activities, such as walking and bird-watching (GHCMA 2008). The Merri Estuary system also includes sites of Aboriginal significance listed on the National Estate (GHCMA 2008).

Major threats to the Merri Estuary system include: sedimentation (caused by clearance of riparian vegetation and stock access to waterways); nutrient inputs (from fertilizer and diary effluent run-off) resulting in nuisance algal blooms; inappropriate engineering works around where the system drains and enters the ocean and agricultural; and urban development (GHCMA 2008).

Figure 4: *The Merri Estuary System. The Map indicates the extent of the asset area.*

Asset Profile 5: Upper Lachlan River

Type of Asset: River Reach

Location of Asset: Between Wyangla Dam and Tarcoola, Central NSW

Brief Description of Asset: The asset is defined as a 150km stretch of the Upper Lachlan River, ~1500 ha of adjacent riparian vegetation occurring over a 100 m width across the river and the threatened native fish species (six present and four potential). It starts at Wyangla Dam and finishes above Tarcoola in Central NSW (Figure 5).

There are numerous Aboriginal cultural sites within the asset area. It is home the Wiradjuri (west), Dharug (east) and Ngunawal (further south) peoples (See PAF- Strang and Martin 2008)). There are pockets of significant habitat in excellent condition supporting six vulnerable, threatened and endangered species of native fish and additional sites have been identified as suitable for a further four native endangered species of fish, which were historically present within the asset (Gilligan and Heath 2008). One of the most significant populations of the endangered Macquarie Perch (*Macquarie australasica*) is found here (Gilligan and Heath 2008).

There are patches of good riparian vegetation with excellent to medium biodiversity potential for over half of the defined reach (Turtle and McNeil 2005). A number of threatened species utilise habitat within the asset area (See PAF- Strang and Martin 2008). This reach of the Upper Lachlan has an unregulated water regime and is used for both stock and domestic water supply (See PAF- Strang and Martin 2008). In dry times the asset area provides valuable grazing land along the river (See PAF- Strang and Martin 2008).

There are a number of major threats to the asset. Unregulated stock access to the riparian area results in: a reduction of woody debris entering the river reducing the complexity of in-stream habitat; erosion and increased nutrient input; and a reduction of on-ground cover which inhibits regeneration of native vegetation (Gilligan and Heath 2008; LCMA 2006; LCMA 2007). Gully erosion is the main cause of sediment "slugs" and increased nutrient inputs to the river (Emery 2008; LCMA 2007; See PAF-Strang and Martin 2008).

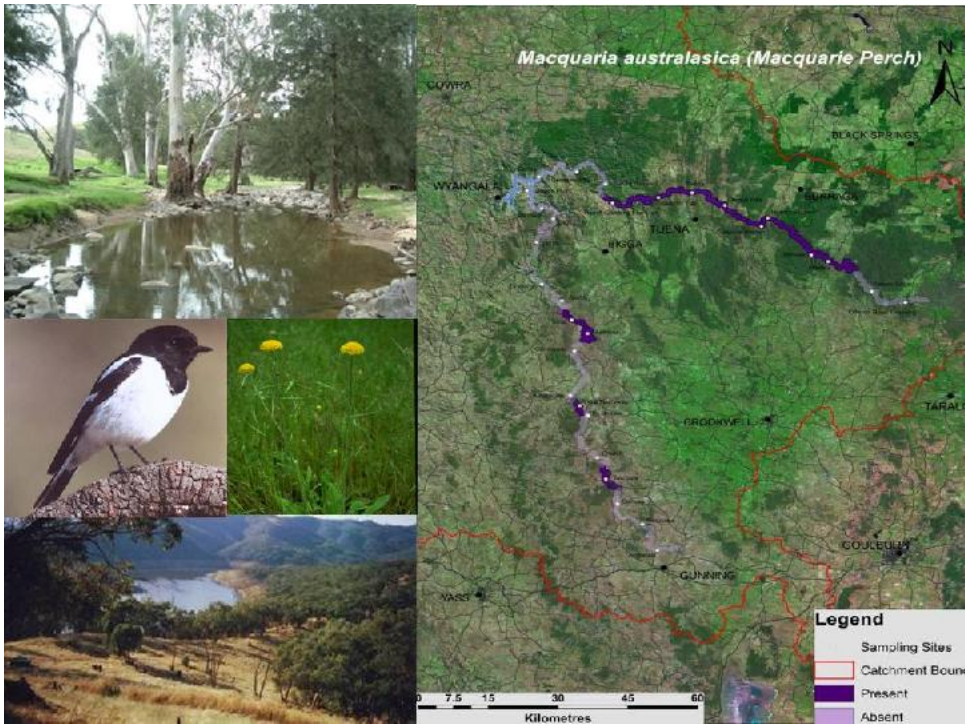


Figure 5: *The map indicates the asset boundaries including riparian vegetation and fish populations. Also shown are the Hooded robin and the Yass daisy, endangered species found in asset area.*

Asset Profile 6: Fire-Sensitive Vegetation Communities of the Hamersley Ranges

Type of Asset: Native vegetation community

Location of Asset: Hamersley Ranges (eastern portion of Hamersley subregion), north-west Western Australia

Brief Description of Asset: The asset is defined as the fire-sensitive vegetation communities of the Hamersley Ranges (Figure 6). The asset is comprised of three main groups: vegetation communities located in topographically protected areas (gorges, wetlands and hilltops), Mulga vegetation communities on low slopes, and unburnt fire-sensitive Spinifex vegetation communities. The project area includes ~600,000ha of National Park, 1.2 million hectares of pastoral lease land and 1.2 million hectares of unallocated Crown land.

Topographically protected areas (gorges, wetlands and hilltops) are highly valued for their aesthetic quality. The Hamersley Ranges are a nationally recognised biodiversity hotspot; they contain many endemic mammals, reptiles and plants. The gorges provide refugia from fire for plant species (especially fire-sensitive species). Mulga/Eucalypt and Spinifex communities occur together and support a diverse range of species. Hamersley Ranges is a popular spot for tourists to visit. Mulga communities provide valuable grazing land for cattle.

A number of threats affect the fire-sensitive communities of the Hamersley Ranges: inappropriate fire regimes; grazing/browsing of low-slope mulga communities by cattle; predation of fauna by feral cats and dogs; donkeys, cattle and horses (which cause significant impact on vegetation cover, structure and extent); and environmental weed invasion by species such as Ruby dock, Natal Red Top, Passiflora, Lucaena, Date Palms, Morning Glory and Buffel Grass. (See PAF- Strang 2009 for further information).

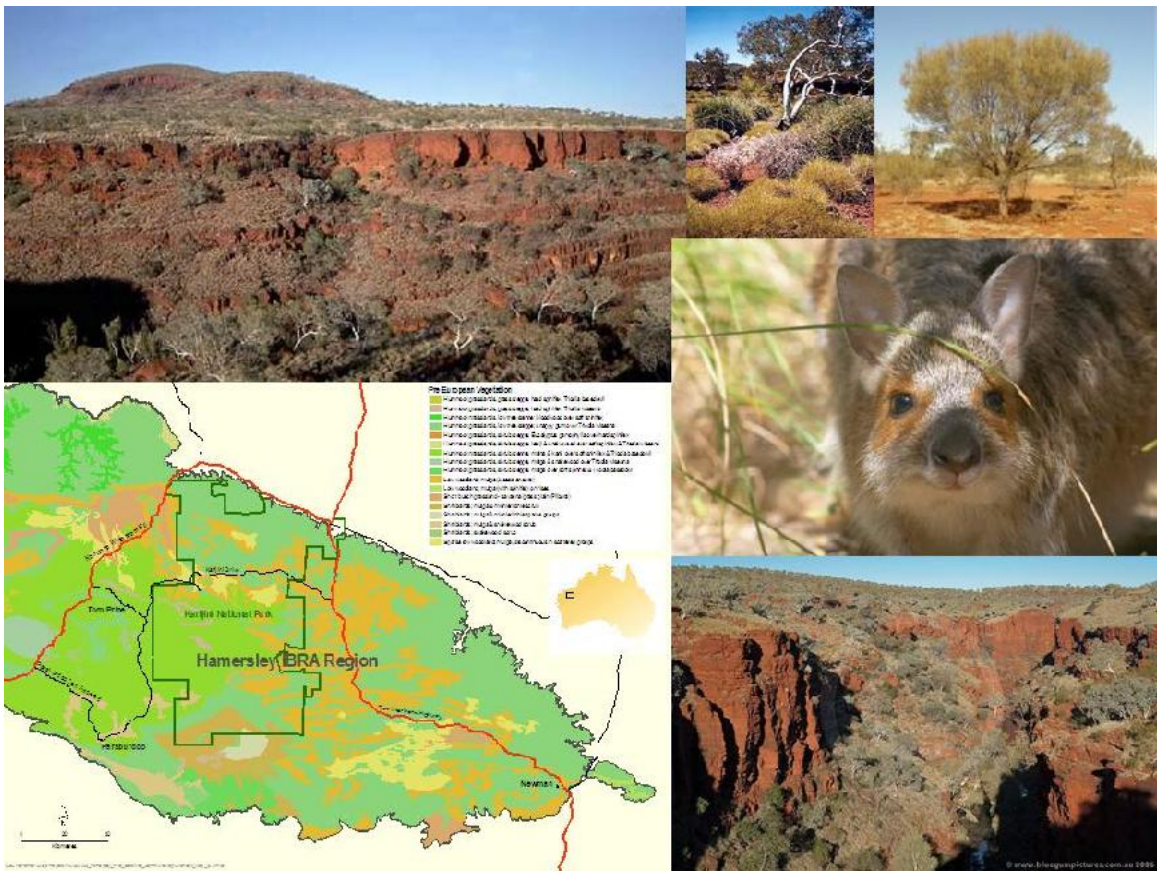


Figure 6: *Bold Green outline indicates the fire-sensitive vegetation communities which are defined as the asset. Values include the Spectacled hare wallaby pictured middle right.*

Asset Profile 7: Great Barrier Reef Lagoon (Burdekin Catchment)

Type of Asset: Marine lagoon

Location of Asset: North-east Queensland, Lagoon and reef surrounding the Burdekin Catchment

Brief Description of Asset: The asset is the near-shore lagoon and reef surrounding the Burdekin Catchment outlet (Figure 7). The near-shore reef supports seagrass beds and mangroves which are important nursery and feeding grounds for numerous species. The Great Barrier Reef (GBR) Lagoon supports a large diversity of threatened and endemic species (www.gbrmpa.gov.au). The GBR system is World-Heritage listed based on satisfying the criteria of outstanding universal value set out by World Heritage Convention (www.gbrmpa.gov.au).

The entire system is protected nationally and managed by the Great Barrier Reef Marine Park Authority. The GBR regions including the Lagoon and surrounding coral are important areas for tourism and recreation activities; proximity to the mainland of the Lagoon makes it a popular destination.

The Burdekin catchment is the largest catchment to input to the GBR Lagoon and has been identified as a major contributor of sediments, nutrients and contaminants that enter the Lagoon and decrease water quality.

Major threats affecting the GBR Lagoon and surrounding coral include: sedimentation (due to erosion from land clearing, overgrazing of pastures, and sugarcane cultivation) which smothers seagrass, corals and mangroves (Haynes *et al* 2007); high nutrient levels (nitrogen and phosphorus) that can cause algal blooms and consequent light attenuation to seagrass and coral communities (Haynes *et al* 2007); and land-based contaminants such as the herbicides diuron, simazine and atrazine, which disrupt seagrass metabolism (Haynes *et al* 2007).

Figure 7: Map insert on the right indicates the asset area outlined in red. The focus is on the receiving Lagoon for waters from the Burdekin Catchment (outlined in blue).

Asset Profile 8: High-Capability Agricultural Land, North East Victoria

Type of Asset: Soil/ Land

Location of Asset: Wangaratta region, North East Victoria

Brief Description of Asset: The asset is the high-capability Agricultural land in the Wangaratta region (Figure 8). The asset includes a mixture of freehold and public land. The total asset area is 39,000ha of which 1,990ha (~5%) is native vegetation and 38,210ha (~95%) is high capability agricultural land (Figure 8).

Agriculture is an important contributor to the community both socially and economically. The "Rural City of Wangaratta 2030 Community Vision", which involved consultation with 600 citizens, emphasizes the desire to conserve the rural landscape character and restrict urban expansion from fragmenting agricultural landscapes to maintain community district identities and the agricultural productivity of rural landscapes.

Agricultural lands form a mosaic of productive land interspersed with native vegetation and wetlands. Management of agricultural land is important for the conservation of fragmented endangered vegetation and to maintain hydrological function between surface and groundwater systems. High capability agricultural land is highly productive and economically important for the Wangaratta region.

Subdivision of land and fragmentation of high-capability agricultural land are the prominent threat acting on these agricultural systems in the Wangaratta region.

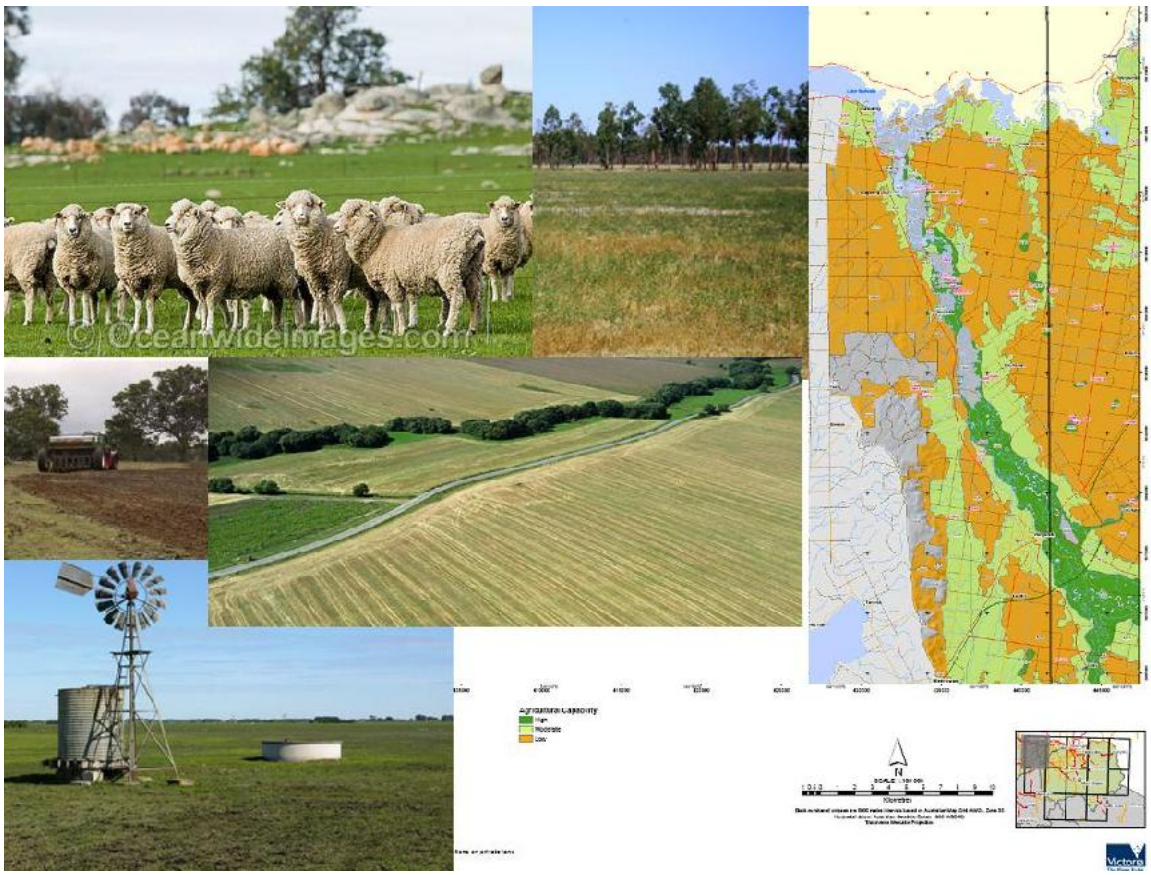


Figure 8: *Agricultural Capability in Wangaratta Region North East Victoria. Dark green represents the high capability agricultural land and is the asset.*

Asset Profile 9: Seagrass Communities of Westernport Bay

Type of Asset: Vegetation

Location of Asset: North-east arm of Westernport Bay, Victoria

Brief Description of Asset: The asset is the seagrass communities along the north-east arm of Westernport Bay, near the township of Corinella, Victoria (Figure 9). The main species found in the asset area is *Zostera/ Heterozostera* (Blake and Ball 2001). Seagrasses have extensive rhizome root systems allowing the plant to anchor into mud and silt, subsequently stabilising sediments (Blake and Ball 2001). Seagrass beds also filter the nutrients and sediments in the water column assisting in the maintenance of water quality in Westernport bay and providing nutrients to the surrounding system (Blake and Ball 2001).

Seagrass communities are ecologically important in Westernport Bay; they are highly productive, providing shelter and food resources for a diversity of species (Blake and Ball 2001). Larval stages of the commercially important blue rock whiting, King George whiting, six-spine leather jacket and rough-spine leather jacket settle on *Heterozostera* seagrass (Jenkins *et al* 1997).The coastal wetlands of Westernport by are protected under the Ramsar convention and ~65% of Victoria's bird species are represented in the bay (WPRCC 1992). Westernport Bay is also recreationally important to anglers (Blake and Ball 2001).

Overall, seagrass beds in the north-east arm of Westernport Bay have been declining over the part 30-40years (Blake and Ball 2001). Water quality decline is a significant risk to the seagrass beds; run-off from adjacent agricultural land results in nutrient (nitrogen and phosphorus) input, erosion higher up in the adjacent catchment from inappropriate land management (dryland grazing, stock access to waterways) causes high sediment loads (EPA 1999). High nutrient and sediment loads reduce the health of seagrass beds (DSE 2003).

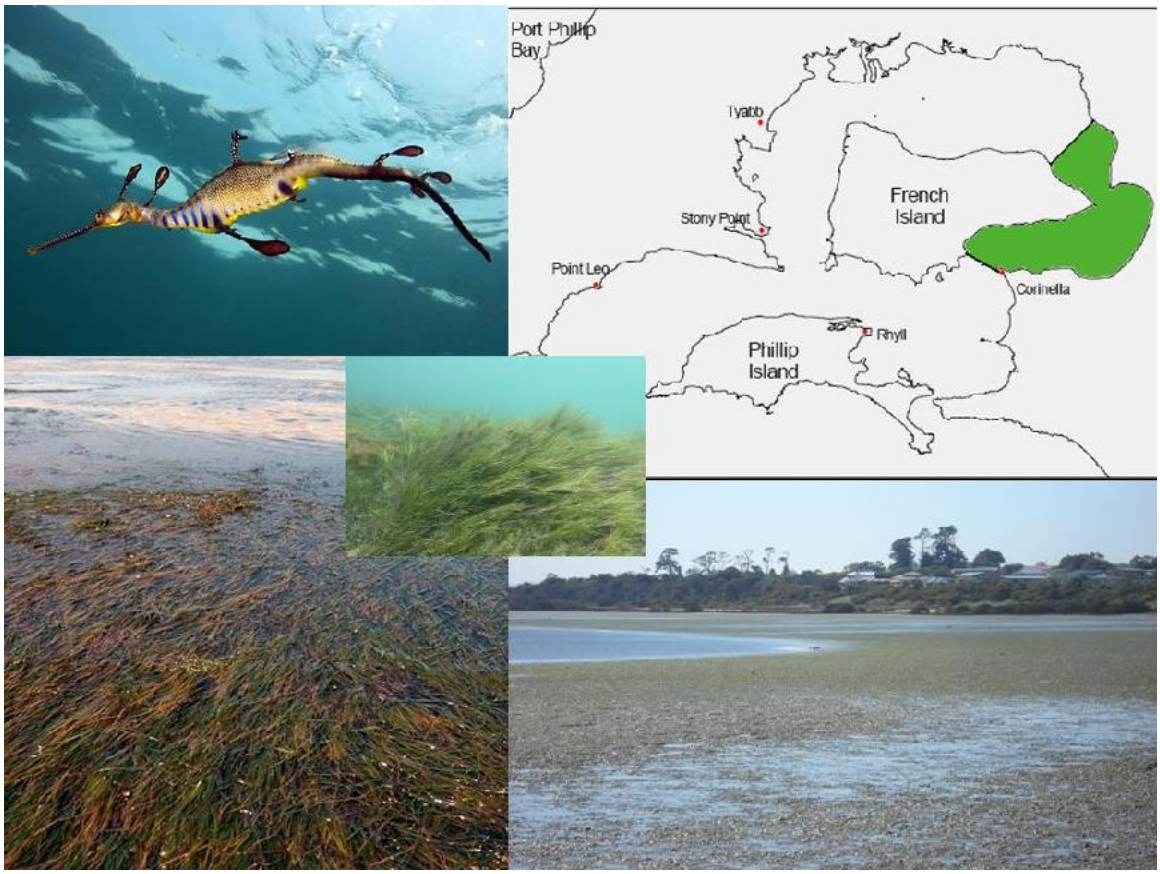


Figure 9: *Seagrass communities of the north-east arm of Westernport Bay. Seagrass exposed and inundated support a diversity of species.*

Appendix 1: Relevant Frequently Asked Questions

Extracted from full list of FAQs at www.inffer.org.

33. Can INFFER assess projects of different scales?

An example could be where one project deals with a single localised wetland, and another deals with a group of wetlands across the region.

Yes, the questions in the Project Assessment Form are scalable to any level. Comparisons between large scale and small scale projects are valid (in principle) because the the Benefit: Cost Index expresses the benefits of the project per dollar of project cost.

However, the reality is that a very small scale project and a very large scale project have some intrinsic differences. The main one is that it is more difficult to give precise answers to the questions of the Project Assessment Form for a very large-scale project. There is likely to be heterogeneity within the area covered by a large-scale project, but in a number of cases INFFER asks you to provide a single value for the overall asset (e.g. technical feasibility or adoption). You have to give a response that best represents the area overall. This makes it a bit more difficult to complete a good assessment for a very large-scale project.

105. Is it appropriate to treat the community as an "asset" in INFFER?

The community is central to the INFFER process, but it is not appropriate to treat it as an asset in the same way as we define a wetland or river as an asset. We assume that the purpose of the public funding is to improve environmental and natural resource outcomes, and while the community plays a number of essential roles in that (see below), we are not investing in the community for its own sake. (There are other government programs that do that.) Rather the program would support the community to pursue environmental and natural resource outcomes that are important to the community.

The process can capture positive spin-off benefits from the project for community capacity if these are significant.

301. How is the community involved in the process?

The community plays several crucial roles in the INFFER process:

(a) The community values different environmental assets differently. We capture community valuation of various assets in community workshops (or draw in information from past workshops or surveys).

(b) Particular members of the community provide important local knowledge about assets, such as the degree of current degradation, and the impacts of current management actions.

(c) For some assets, it is primarily up to members of the public to implement the works that would be required to manage the asset. We ask about likely landholder responses to the project in the Project Assessment Form, and this information plays a key role in both the Public: Private Benefits Framework (for selecting appropriate policy tools) and the Benefit: Cost Index.

Appendix 2: INFFER Asset Documentation Sheet

Background

This sheet is a suggested recording system which will help with the documentation of information for the first step of the INFFER process: identifying assets that are potentially high priorities for investment.

People often identify assets through group discussion and using a map to spatially represent their location. The sheet on the next page can be used as an aid to record the discussion/justification of why particular assets were chosen. This helps to capture some of the information required for the next steps of the INFFER process and helps keep decision making transparent.

Instructions

Fill out one sheet per asset. The sheet has a number of sections, as follows:

Name of asset: This should be something that stakeholders and the community can associate with the asset.

Location: Include a simple description of the location of the asset, include a town name as a reference point and if possible include the catchment/bioregion/landscape in which the asset sits.

Description of asset: Include the type of asset (e.g. river reach, wetland, etc), the physical dimensions of the asset (e.g. 300ha, 10km river reach), and the tenure of the asset.

Current condition of asset: Describe the current condition of the asset relative to its original condition and if possible indicate what is happening to the asset's condition (e.g. declining, steady, improving).

Community/social value: Describe what makes the asset significant to the community (e.g. amenity, philosophical, spiritual, or recreational value).

Environmental value: Describe the values the asset generates for the environment (e.g. habitat for threatened species, intact vegetation).

Economic value: Describe the economic values the asset has (e.g. consumptive uses such as water resource, or productive uses).

Threats to asset: List all of the threats that are known to impact on the current or future condition of the asset.

Other discussion notes: This section is to capture any additional information about the asset which may be useful for future reference.

An example of a completed Asset Identification Sheet is provided below.

INFFER Asset Documentation Sheet

Name of asset		
Location	**Description of asset**	**Current condition of asset**
Community/social values	**Environmental values**	**Economic values**
Threats to the asset	**Other Discussion notes including key information sources**	

INFFER Asset Documentation Sheet - Example

Name of asset		
Tang Tang Swamp		
Location	**Description of asset**	**Current condition of asset**
6km west of Dingee in North Central Victoria In the Bendigo/Myers subcatchment of the Loddon catchment	Shallow freshwater marsh and immediate area in the wildlife reserve 126ha in size Managed by Parks Victoria	Marginal and declining due to dry times Last time the swamp was full of water was spring 2001
Community/social values	**Environmental values**	**Economic values**
Indigenous cultural value with a number of oven mounds present Community value this site for recreation and aesthetics	Brolga breeding site JAMBA and CAMBA waterbirds recorded there Rare and vulnerable flora species are also present	Tourism Water quality
Threats to the asset	**Other Discussion notes including key information sources**	
Salinity Altered water regime Nutrients Invasive plants – spiny rush Invasive animals	Tang Tang swamp is part of a chain of wetlands extending north along the Bendigo Creek to the Murray River There used to be grazing licences available for the swamp until 1998. There are several bores monitored across the swamp	

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Hamersley Ranges Fire Sensitive Vegetation Communities

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Seagrass Communities- Westernport Bay

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http://www.dpi.vic.gov.au/CA25677D007DC87D/LUbyDesc/207+-+Fish-e-Fax+zostera+seagrass+bed/$File/207+-+Fish-e-Fax+zostera+seagrass+bed.jpg
http://www.svpelican.com.au/images/gallery/2bays2006/images/Untitled-19.jpg
http://www.dse.vic.gov.au/CA256F310024B628/0/BAE7D90BE80269C8CA2572B3001CBB48/$File/Western+Port+report.pdf
http://images-0.redbubble.net/img/art/size:large/view:main/554958-6-weary-weedy.jpg