Striking the balance between oversimplified and overdetailed: A tale of two report cards

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Key Points
- Environmental report cards that communicate to wide audiences can be criticized for being oversimplified, but traditional detailed reports may only be accessible to technical audiences.
- We have developed an approach to designing report cards that involves conducting comprehensive user research and using a progressive disclosure design pattern that supports user with different needs to access the different levels of detail they want in a single report card.
- We applied this approach to design the Reef Water Quality Report Card and the Healthy Waterways Strategy Report Card to satisfy the needs of most users.
- Designers of environmental report cards can use this approach to reach a wider range of audiences without compromising the integrity of the scientific data.

Abstract

Report cards have long been a popular way of communicating the condition of ecosystems and natural resource management activities. Because they are often pitched at a wide audience, they are regularly criticised by those who conduct the science behind them, as being 'overly simplistic', or 'dumbed down'. Yet the common alternative is the detailed technical report, which may be accessible to a very small audience and criticised for being 'boring'. So, what is the alternative?

We have developed an approach to designing report cards that provides the best of both worlds—simplicity for all and detail just for those who want it. Using a traditional interactive design pattern called progressive disclosure and conducting comprehensive research with users prior to design, we can identify which information is most important to which users and serve it up accordingly.

By following this approach that provides the right information, to the right person, at the right time, designers of natural resource management report cards and other reporting applications can communicate to a wider range of audiences, with a single product, without compromising the integrity, robustness, and defensibility of the scientific data.

In this paper, we describe our approach to designing interactive environmental report cards and how we applied it to design the Reef Water Quality Report Card and the Healthy Waterways Strategy Report Card.

Keywords

Environmental report cards, Progressive disclosure, User experience

Introduction

Environmental report cards are a key tool in communicating ecosystem health and progress towards management targets and performance objectives. They are used widely in the management of waterways, in Australia and internationally to facilitate transparency, awareness and effective management responses (e.g. Healthy Land and Water Report Card (Healthy Land and Water 2020) and Chesapeake Bay and Watershed Report Card (Integration and Application Network 2020). Report cards often use scaled grading metrics (e.g. A

to E, or on track to off track) to communicate complex, data-driven assessments to broad audiences in a simple and accessible way (Costanzo et al. 2017).

When designing environmental report cards, however, there are trade-offs between creating a product that is simple and accessible and having the appropriate level of detail to ensure the integrity of the data is maintained in a robust and defensible manner. Indeed, there is often conflict with scientific contributors regarding the level of contextual detail presented and criticisms that the science has been 'dumbed down' or is overly simplistic. These are legitimate criticisms, as the traditional report card format, although useful for communication to broad audiences, may not be useful for natural resource management practitioners, who naturally require more detail to formulate effective management responses. Conversely, the more detailed written report style format is largely inaccessible to a public audience and many decision-makers.

Web-based formats, as opposed to the traditional print formats, provide new opportunities to overcome the simplicity-detail tradeoffs with drill-down interactivity. Our approach, detailed below, harnesses those interactive features.

Our approach

Broadly, our approach to designing environmental report cards is comprised of detailed user experience research and iterative user interface design based on progressive disclosure.

User experience (UX) research

UX research allows us to determine each different user group and understand their specific needs. Our process for this is as follows:

1. **Identify the specific user groups** that will use the report card.

2. **Conduct user interviews** that are structured to gain insight into demographics, computer use, what content was most important to the users, how they currently use content and what features they would like to see.

3. **Develop user personas** which are fictional characters that represent the different user groups that help the designers and developers to understand the user's needs, experiences, behaviours and goals.

Iterative user interface design based on progressive disclosure

Progressive disclosure is a traditional interaction design pattern that is often used in complex software applications. It addresses two conflicting user needs: 1) Power – users want features, options and details; and 2) Simplicity – users want to perform a task or obtain information as quickly as possible and without taking the time to learn (Nielsen 2006). Progressive disclosure addresses these conflicting needs by initially showing users only the most important information or options and then allowing users to request more detailed information or options by drilling down deeper into the content. This pattern lends itself particularly well to scientific information to strike a balance between accessibility and necessary complexity.

The development of user personas in our UX research, helps us understand which users prefer simple and accessible information and which users prefer more detailed and complex information and what specific questions they want to ask of the report card. This then informs the design of the various user interfaces that typically start at a simple snapshot and allow users to go deeper into more detailed and complex views. Design happens iteratively – we start with wireframes to establish we have all the basic functionality and information we've identified for the users. We then use those wireframes as a base to create high-fidelity mockups. High fidelity mockups make it easier for the users to understand what we are going to create and easier for them to assess if the report card will meet their needs.

The following case studies provide examples of our approach to designing interactive web-based report cards in action.

Case study one: Reef Water Quality Report Card

(https://reportcard.reefplan.qld.gov.au/)

Background and context

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program is responsible for reporting progress towards water quality, land and catchment management targets set out in the Reef 2050 Water Quality Improvement Plan (State of Queensland 2017), as well as inshore marine condition reporting in the Great Barrier Reef and catchments. The program had a solid reporting framework and as well as producing a simple annual report card (in print and online), generated a large number of written reports to assess progress.

The Office of the Great Barrier Reef (OGBR) and federal Department of Agriculture, Water and the Environment (AWE) wanted to create a fit-for-purpose interactive report card that would allow them to report on the joint Reef 2050 Water Quality Improvement Plan targets in an accessible way that clearly communicates the context in which they exist. They also wanted to strike a balance between their simplistic report cards and their detailed reports, by supporting 'scores' with additional contextual data that would be useful to users without being prohibitively complex.

Process and insight

User experience (UX) research

User interviews

Following initial conversations with OGBR we developed a list of user groups or typical audiences who we should target for UX research. We then worked with OGBR to find contacts who represented those user groups and contacted them to conduct in-depth user interviews. The interviews were structured to gain insight into demographics, computer use, what content was most important to the users, how they currently use content and what features they would like to see in an interactive reef report card. In all, we conducted phone and in-person interviews with around 16 people from state and federal government bodies, natural resource management (NRM) groups, industry bodies, environmental groups, and the general public.

User personas

Once the interviews were completed, the results were compiled and used to create user personas (Figure 1). The personas are used as internal design documents, used by designers and software developers, that provide a profile of the various users to inform the design. We identified six user personas: federal and state government reef policy advisors, natural resource management (NRM) investment planners, on-ground NRM delivery managers, industry advocates, environmental advocates and concerned citizens.

Some of the primary insights that we gained from the user research was that different user personas were interested in different information at different spatial scales and different levels of detail. For instance, users from NRM groups typically were interested in seeing a snapshot of the results for their own region only, but they also wanted a significant level of detail to allow them to understand how the scores for their region were derived. Industry advocates on the other hand, were keen to be able to view the results for their industry's performance across all the regions and catchments. Concerned citizens were after a more basic snapshot to indicate if the reef was doing well or not.
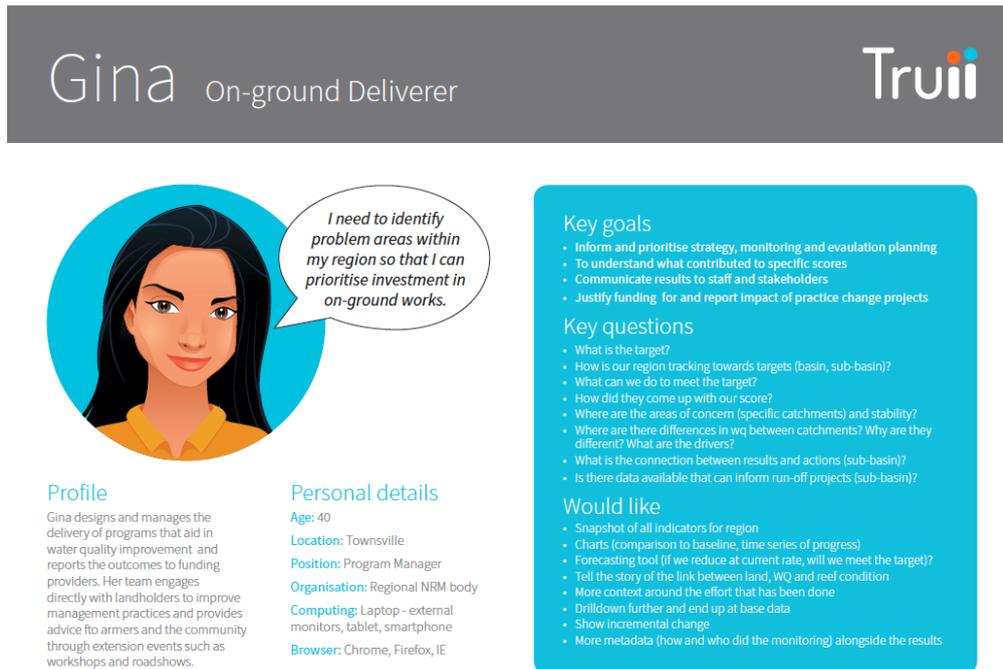
Figure 1. Example of a Reef Water Quality Report Card User Persona

User interface (UI) design

The insights gained into the varying scales, content and levels of detail that the different user groups wanted drove the core of the UI design, of which the navigation is generally the most important interaction. We wanted users to be able to get to the information they sought as quickly and painlessly as possible using any device.

We created a navigation and structure based on progressive disclosure (Figure 2), which allowed users to start with high level content and get to more detail as they desired. In addition, we were able to meet the needs of the different user groups by allowing navigation, both spatially and by indicator. We also employed both a map navigation and a dropdown navigation, to allow for cross-device accessibility.

Significant effort was focused on ensuring that each indicator had the right contextual information displayed, particularly with data visualisations. A template for each indicator was developed and where possible indicators shared aspects of a template to improve efficiency and usability. Following many wireframe iterations, the high-fidelity interfaces were designed. These mockups showed precisely how the interface should look.

The general design is split into an inshore reef and wetland condition assessment and an assessment of progress towards catchment targets. In each assessment, the initial view displays a simple snapshot of all indicator results at the whole-of-region scale. Users can then drilldown spatially and see a snapshot of all indicator results at smaller spatial scales. Alternatively, they can drilldown by indicator, which allows users to see the detailed results of a specific indicator including contextual information such as descriptive text, charts and other information. Drilldown further still and users can see detailed indicator, and even sub-indicator results, for specific catchments and sub-catchments. Even more detailed data tables, data downloads and supporting information can be accessed via toggle controls on each panel of each page.
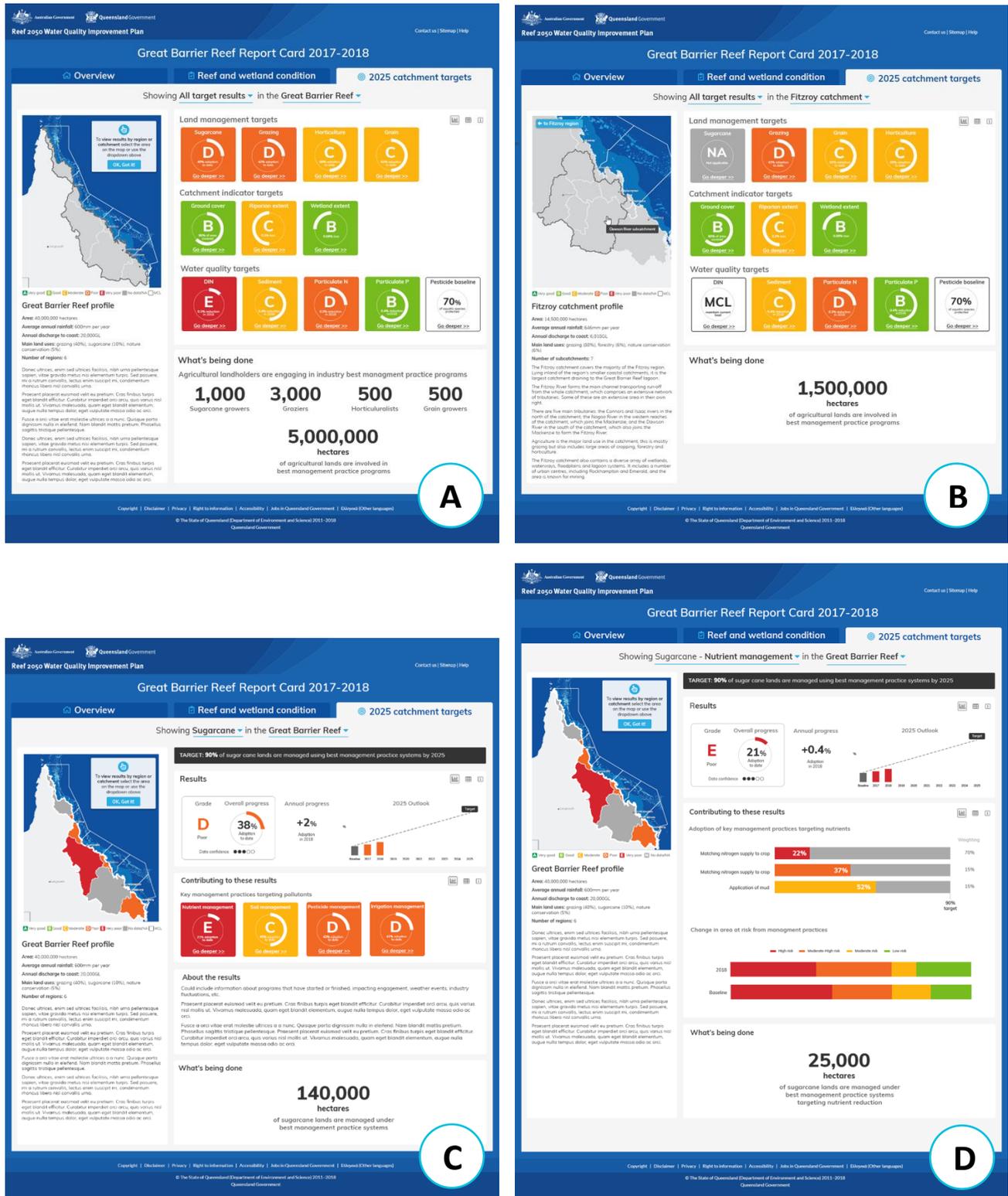
Figure 2. User interface mockups illustrating progressive disclosure to report catchment targets in the Reef Water Quality Report Card: A) Snapshot of all indicators at the whole-of-region; B) Snapshot of all indicators at catchment scale; C) Detailed results for sugarcane management targets; D) Detailed results for sugarcane sub-indicator targets.

Testing

Usability testing was performed with users who were representative of the user groups identified in the personas. Tests were conducted one-on-one with a facilitator and test participant. Participants were asked to perform a series of tasks to assess if the goals and questions identified in the personas could be achieved and answered, respectively. All usability issues revealed in the testing were resolved prior to release.

Case study two: Healthy Waterways Strategy Report Card

(https://healthywaterways.com.au/)

Background and context

The Healthy Waterways Strategy is a vision for the health of rivers, estuaries and wetlands in the Port Phillip and Westernport region in Victoria. It is a 10-year strategy (2018-2028), that was developed largely in a co-design process with Healthy Waterways partners, including state government and agencies, local government, the catchment management authority, local waterway groups and the community.

The strategy identifies key values of the region, such as birds, frogs, platypus and amenity and waterway conditions that impact those values, such as stormwater, water quality, habitat condition and access. Baseline conditions and 50-year targets were established for each value and condition across five catchments, 69 sub-catchments, 82 wetlands and 29 estuaries. For each of the 168 reporting units, 10-year performance objectives that equate to on-ground actions were developed. This equates to over 1000 individual objectives, all of which must have their progress reported annually.

The monitoring, evaluation, reporting and improvement (MERI) framework for the strategy was developed alongside the website, which posed significant challenges for determining how different indicators would be reported.

Melbourne Water wanted an accessible site to house the strategy and enable annual reporting of performance objectives and five-yearly reporting of values and conditions across all waterway types and spatial scales.

Process and insight

User experience (UX) research

Following consultation with Melbourne Water, broad user groups were identified that were largely based on groups that had participated in the co-design of the strategy.

User interviews

We conducted 13 interviews with representatives of the various user groups identified by Melbourne Water. From these interviews we identified a wide variety of different user needs and goals. For instance, engaged citizens who are often members of local community groups are primarily interested in their own patch and they want details of what is happening there. Whereas a waterway manager, including senior staff within Melbourne Water or the state government, are interested in the bigger picture of progress across the whole region.

One of the most formative findings of the interviews was that progress towards performance objectives, as opposed to conditions and values, was far and away the most important content to the majority of users.

User personas

Using the findings of the surveys, we created user personas that represented the key users, their profiles, goals and needs. The five user personas identified were waterway managers, strategic planners, urban water planners, on-ground deliverers and engaged citizens.

User interface (UI) design

The initial UI design was created as a concept prior to any significant work having been done on the strategy MERI framework. At this stage the baseline and targets for the key values and waterways conditions had been set and although the performance objectives had been established, work on how these might be reported from an indicator or data availability point-of-view was limited.

The preliminary design concept was largely focused on the values and conditions, which were a lesser priority for users, and as a result the design changed significantly from concept to delivery. Once the MERI framework was further developed and it became clearer how these would be reported, we realised that the amount of information that needed to be reported was immense and complex, far too much even for our progressive disclosure approach to manage. Previously, we had anticipated that all indicators (values, conditions and objectives) would be reported similarly, but this would no longer be possible.

A major design decision was made by the project team – the Report Card would be dedicated specifically to reporting progress towards the 10-year performance objectives, to allow this information, which was deemed most important by the majority of users, to be accessed as easily as possible and not be overcrowded with reporting of the conditions and values. Key values and waterways conditions would be reported in detail separately in a more freeform storytelling fashion with supporting data where it was available. In all, more than 20 iterations of the design (Figure 3) were created.
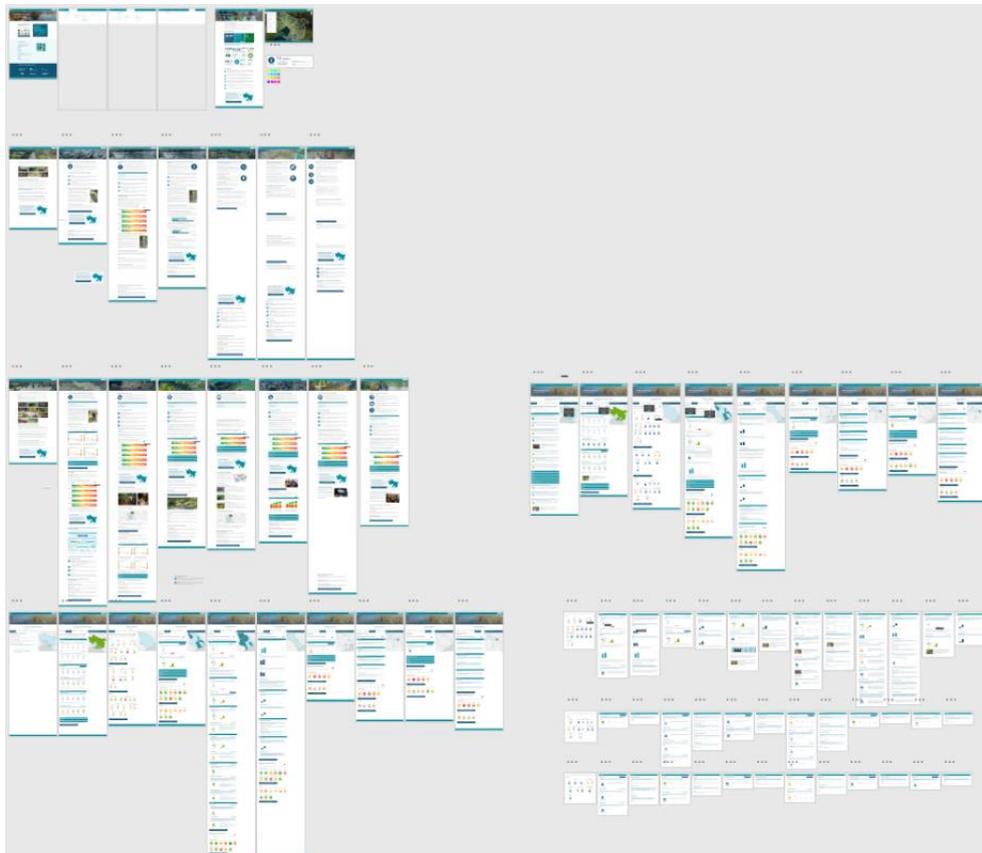

Figure 3. Example of a UI design board for the Healthy Waterway Strategy report card and website

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The separated report card design allowed us to present the users with the information they want most in a number of different forms. They can navigate to different spatial scales and waterway types, view snapshots of catchment scale results and using our progressive disclosure approach, drilldown to more detailed data, and more local contextual information. Report views included snapshots of progress for all indicators across the region, snapshots of progress towards all catchment scale results by waterway type (rivers, wetlands and estuaries) (Figure 4), detailed results at the two aforementioned scales (Figure 5) and detailed results for each individual waterway (more than 1000 individual reports across 169 spatial units). Drilldown further still and users can access detailed case studies of management actions. In a separate area of the website users can access rich content on the key values and waterway conditions and how these, less frequently reported (five-yearly) indicators, are tracking towards the long-term targets.
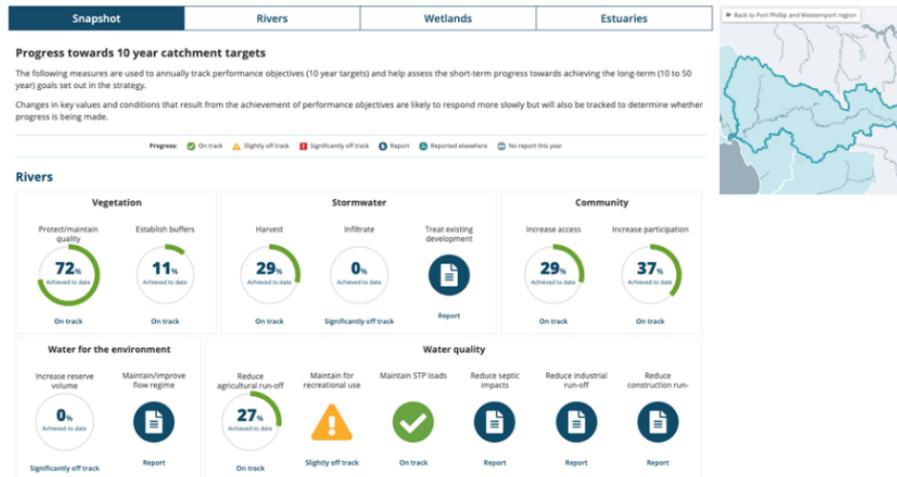

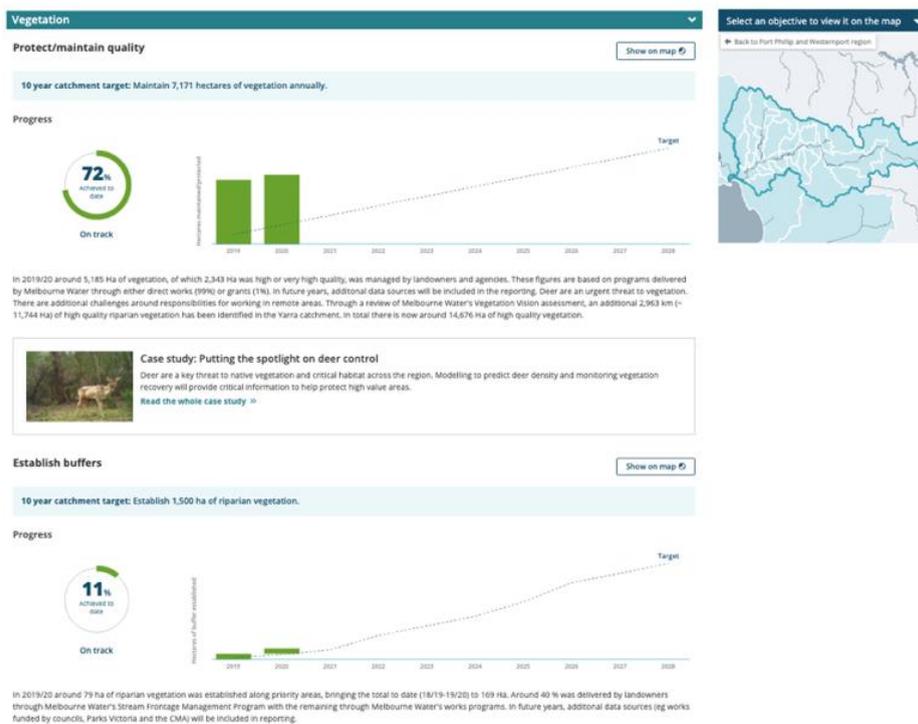**Figure 4. Snapshot of progress indicators in rivers in the Yarra catchment**

Figure 5. Detailed view of progress indicators in rivers in the Yarra catchment

Conclusions

Our approach to designing environmental report cards combines comprehensive user research with a user interface design based on a progressive disclosure design pattern. Comprehensive user research helps us understand the different levels of information, data and scales that the users of a report card need. User interface design based on the progressive disclosure allows content to be served up at appropriate levels for each user group.

Using this approach to design the Reef Water Quality Report Card and the Healthy Waterways Strategy Report Card, we found that you can't please all the users all the time, but you can please most of the users, most of the time.

Acknowledgments

The authors would like to thank the Office of the Great Barrier Reef and Melbourne Water who funded the project on which the case studies were based, as well as all of those involved in the design and development of the report cards.

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