This paper details our early reflections as Human-Computer Interaction (HCI) practitioners working on an interdisciplinary project to redesign and resituate a fire information system for wider community use. We are part of a team at Edith Cowan University collaborating with Landgate, the department of land information in Western Australia, on a project that is funded by an ARC Linkage Grant. FireWatch was originally created by Landgate to provide members of emergency services organisations and government departments with information on fire locations in Western Australia. While this website provides a high level and amount of technical information, it suffers from its history of being focused solely on the needs of technical users. Therefore, the main purpose of the project is to redesign the FireWatch website to accommodate members of the wider community, particularly in rural areas. There are two major aspects to the project. First, the developers/designers' perspective on redesigning the website to be user-centred with a strong focus on empathic design. Second, the project is concerned with how rural communities prepare and respond to fire threats.

One of the key objectives of our redesign is to make it usable and accessible to members of the general public – specifically those situated in a rural setting. The focus on a rural site in the far north of Australia is due to both the size and frequency of bushfires in this area. A technical limitation of the satellite data means that only fires larger than 1 kilometre in diameter will be shown by FireWatch, and most of these fires are situated in the far north of Australia. Involvement of potential users is crucial to tailor the website to be appropriate for the users. However, due to the timing of the two halves of the project, we have not been able to engage directly with potential users. In this project, we are reliant on a research officer from the community half of the project conducting ethnographic work within a remote community. Due to its location and sizeable population, Kununurra has been chosen as the trial site. The role of the research officer is to establish key contacts in the Kununurra community and act as a mediator-user in this project. We will then approach members of this community to trial the prototype website and conduct interviews based on their experience with the website and map-based interfaces generally. The ethnographic work will commence several months after we were due to commence prototyping. Therefore, we have had to find a way to bridge the gap between starting the design, and, when we are able, to gain significant input directly from our future real-world users.

Users are the cornerstones of every product that designers build and this view is shared throughout the field of HCI (e.g., Norman, 2004; Nielsen, 1994). By reason of this emphasis on user-centred design in HCI, we consider it essential that a design is built with its users as the most important focus and that, ideally, their input should be sought from the beginning (Carroll, 1997; Garcia *et al.*, 2010). User-centred design aims to include users (directly and indirectly) from the outset, as it allows designers to make informed decisions – based on a better understanding of users' actions and how and why they perform actions (Lanfranchi and Ireson, 2009, p.199). As described above, the circumstances of this project, including the remote user base, the later deployment of the research officer and other contributing time constraints, mean that direct input from users is not feasible until after initial prototyping has begun. To address this, scenario-based design has been utilised as a significant part of our methodology to allow us to begin the design and development of a prototype interface.

Scenario-based design is an HCI methodology for considering the needs of potential users, without their direct input (Carroll & Rosson, 2002). Scenario-based design gives the interface designer the ability to create contextualised scenarios of use, along with postulations on the various types of users and their needs, expressed in the form of personas (Grudin & Pruitt, 2002). Scenario-based design is particularly useful in the initial phase of a project where exploration and discussion of contents, users' needs and requirements are encouraged among designers. The main benefit of scenario-based design is the development of rich, in-depth, and realistic stories explained in a natural way explaining potential users and their likely experiences (e.g. situations, settings, emotional states, etc.). By 'walking through' informal narrative descriptions in the form of a story, scenario-based design focuses on the human activities undertaken by users rather than the technology itself (Sharp, Rogers & Preece, 2006). It explains why people do the things as they do and what they are trying to achieve. Scenarios and personas can be powerful communication mechanisms, especially when real world issues preclude the direct involvement of users at a critical stage, which is the case with the FireWatch project. In this instance, scenario-based design is acting as:

- A bridge to "fill the gap" in our collaborative project, where, due to circumstances beyond our control, vital information from users is unavailable to us before the prototyping stage;
- A catalyst to "kick-start" the project to compensate for the lack of direct contact with users; and

- A brain-storming communication tool among designers to “tease out” and establish requirements for the redesigned website.

Based on the scenario-based framework of Rosson and Carroll (2002, p.25), the following table has been created to document the requirements of our FireWatch scenario of use:

Requirement	Description
Root concept	The existing public access website at http://firewatch.landgate.wa.gov.au/ is the starting point. The initial objective is to try and improve the usability of the current site, catering for members of the general public and catering for cross-browser and cross-device compatibility.
Field studies	The initial design will be conducted prior to real-world studies (in the form of a survey and semi-structured interview), hence the need for a scenario-based approach. This scenario, and the personas involved, will be based on information provided by Landgate staff and information from the NAFI project.
Summaries	The initial task will be to improve the usability of the current public access version of FireWatch. Further iterations, which will involve real world users, will focus on both usability and functionality while ensuring to meet the needs of users.
Problem scenarios	Problems will be addressed as they arise. This is likely to happen after feedback has been received from users through the survey and semi-structured interview.
Claims analysis	As discussed previously, this research will combine theory from HCI, web best practices (including flexible grid design), visual rhetoric and findings from the NAFI website.

To enable designers to create useful scenarios, Rosson and Carroll (2002, p.18) created a table of elements characteristic of interaction scenarios. These elements are described within the context of FireWatch below.

Scenario element	Definition	FireWatch scenario
Setting	Situational details that motivate or explain goals, actions and reactions of users	The goal of this redesign is to improve the usability and functionality of the public access version of the FireWatch system, allowing for it to be easily adopted by the wider community.
Actors	People interacting with the computer interface – personal characteristics relevant to the scenario	There will be various types of users interacting with FireWatch: these will include pastoralists, local council representatives, indigenous landowners and members of community organisations. Personas will be used to describe each type of user in detail, along with their reasons for using the interface and their technical experience and limitations.
Task goals	Effects on the station that motivate the actions of actors	The task goal will be for users to easily locate bushfire threats near their location, allowing them to make informed choices about how to respond to these bushfire threats.
Plans	Mental activity directed at converting a goal into a behavior	Users will be able to easily pan to the desired location and zoom to a reasonable level to allow them to view threats in their vicinity. It will also easily allow them to select the type of information layers that they desire.

Evaluation	Interpreting features of the situation	Evaluation will be carried out after feedback from users has been obtained.
Actions	Observable behavior	User actions will be determined by feedback from users, information from Google Analytics and observations from the community side of the project.
Events	Actions or reactions produced by the computer, which may not be visible to the actor but relevant to the scenario	Actions will include zooming and panning the map, allowing users to select layers of information and refreshing the map. Future events (i.e., functionality) may be added or removed, as required, based on feedback from users.

These elements describe a scenario where various types of users are engaging with the FireWatch interface, with the goal of informing them of fire threats in their vicinity. Distinct personas have been created to address the various types of users (actors) that may be encountered throughout the duration of the FireWatch project. These personas are based off information from Landgate, the research officer's prior experience in rural communities and previous research from the North Australian Fire Information (NAFI) project (Tropical Savannas CRC, 2012). At this stage, the distinct personas can be classified as a pastoralist, a local police officer, a volunteer of a community organisation, an indigenous landowner, a local tourist operator and a local community organisation leader. These personas will be explained in more detail as the project evolves, but as an initial starting point, we have created the following table, articulating useful characteristics about each persona. It also envisages the technical devices that these personas use on a daily basis:

Persona type	*Pastoralist*	*Local police officer*	*Indigenous land manager*	*Local community representative*	*Local volunteer*	*Tourist operator*
Overview	A livestock farmer, who may also grow crops.	Local figure of authority. Has ties to many organisations and government departments in the area.	Act as traditional custodians of the land. Indigenous people have a deep cultural and spiritual connection to the land.	Leader of the Kununurra branch of an organisation such as the CWA or Rotary Club.	Local community member who volunteers for an emergency organisation, such as Kununurra Volunteer Fire & Rescue.	Owns and/or runs a local tourism company. Would know many people in several industries and about local events.
Computer Skills, Knowledge, and Abilities	Has a low level of computer skills.	Moderate level of computer skills. Used to using email, the internet and Microsoft Office software.	Moderate level of computer skills. May be familiar with NAFI website.	Moderate level of computer skills – familiar with Office software, email and internet.	Low-moderate level of computer skills. Uses internet and email.	Moderate-high level of computer skills. Frequently uses email and internet, and administers own website.
Internet-enabled devices	Home computer.	Work computer, home computer and smart	Work computer and smart phone.	Work computer, home computer.	Work computer, home computer.	Work computer, tablet device (iPad) and

		phone.				smart phone.
Expectations of FireWatch	Intends to use it to plan for fire threats and in the instance of emergencies close in the vicinity.	Intends to use FireWatch to assist in the preparation of fire response plans. Also may use it as an information source in an emergency response situation.	Intends to use FireWatch primarily as a planning tool.	Intends to use FireWatch primarily as a planning tool.	Intends to use FireWatch to assist in the preparation of fire response plans. Also may use it as an information source in an emergency response situation.	Intends to use FireWatch to assist in the preparation of fire response plans.
Experience with map websites	Has some familiarity with NAFI and the Bureau of Meteorology website.	Is familiar with Google Maps and Bureau of Meteorology website.	Knows NAFI, Sentinel and the Bureau of Meteorology website well.	Is familiar with Google Maps.	Is familiar with NAFI and Google Maps.	Is familiar with NAFI, Google Maps and the Bureau of Meteorology website.
A description of how the user will engage with FireWatch	The pastoralist will use FireWatch to monitor fire threats close to the boundary of his or her property.	The police officer will use FireWatch to monitor fires around the wider Kununurra area. They will use the	The indigenous land manager will use FireWatch to monitor fires around the greater Kununurra	The local community representative will use FireWatch to monitor fires around the greater Kununurra area. They	The local volunteer will use FireWatch to monitor fires around the greater Kununurra area. They will use the	The tourist operator will use FireWatch to monitor fire threats close to the boundary of known tourist

	They will likely know the longitude and latitude of their property, and will use this to zoom into view the area around their property.	search function to zoom to view the entire town and surrounding areas. Will also want to view previous fires to assist in planning for emergencies.	area. They will likely search using the town name to view fires in the vicinity. Due to previous experience with NAFI and Sentinel, the indigenous land manager has higher technical capability than other users.	will use the search function to zoom to view the entire town and surrounding areas. Will also want to view previous fires to assist in planning for emergencies.	search function to zoom to view the entire town and surrounding areas. In particular, as a volunteer of an emergency organisation, they will also want to view previous fires to assist in planning for emergencies.	attractions and to check if any fires are near roads. They may know the longitude and latitude of tourist attractions, and will use this feature to zoom into view the areas of interest.

Documenting these characteristics for six personas has enabled us to commence a prototype design to meet the needs of these users. Based on the information above, we know that the interface will need to work across multiple devices, including smart phones and tablets. We can also presume that various users may want to search for their location by the name of their town, while others will use longitude and latitude coordinates. We also know that our users have varying degrees of technical ability. To deal with this, we are initially building the prototype to be very easy to use, with a minimal design and simple functionality. Ease of use is also critical in potentially stressful situations (Lanfranchi & Ireson, 2009). Although FireWatch is not intended to act as an alert system, it may still be used in potentially stressful situations, so ease of use will be a key objective of the interface.

Another benefit of using scenario-based design is that it enables designers to easily relate to users, and users' feelings are observed as they immerse themselves into stories they explore and create (i.e., empathic design). This is particularly important in the FireWatch project, as the information being delivered may be of a potential emergency situation. Also, more personas may be added to the list as we deal directly with real-world users further into the project. The fact that scenario-based design allows us to create concrete scenarios, while allowing them to be flexible and evolve as the project progresses, is one of the advantages that we have discovered in incorporating it into our methodology. Personas also provide a practical framework for presenting data collected through other methods (Grudin & Pruitt, 2002). In the context of our research, data will be collected from real-world users through an online questionnaire and semi-structured interviews. This data will be used to expand on and more realistically inform our personas and scenarios.

While different disciplines utilise proprietary project management methods, scenario-based design also bridges gaps between practice-specific epistemologies, allowing contributions from different fields to feed the project at any stage of its progress. This is particularly useful in a project such as ours, where a large number of stakeholders are involved sharing different expectations. Scenarios provide an interface designer with a method of considering the various stakeholders in a project, including end-users. This allows for the designer to consider details of how users might approach a system and the implications of this for the interface design. These scenario descriptions are written using universally accessible language, which also allow for non-technical users and other parties to gain an understanding of the functionality of an interface without being over-burdened by technical information. This universality facilitates participatory design, by allowing for input from all of the interested parties (Carroll & Rosson, 2002). A scenario-based approach to outline a project scope enables stakeholders to unify their understanding of the project by articulating the situations in which the interface will be used. This has enabled us to commence a prototype that would otherwise have been postponed for several months while awaiting input from real-world users.

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