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STATISTICS FOR  
COMMUNITY GOVERNANCE:  
THE YAWURU INDIGENOUS  
POPULATION SURVEY OF BROOME

J. TAYLOR, B. DORAN,  
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Aboriginal Economic  
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# Statistics for Community Governance: The Yawuru Indigenous Population Survey of Broome

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## Abstract

This paper presents a case study of an exercise in Aboriginal community governance. It sets out the background events that led the Yawuru Native Title Holders Aboriginal Corporation to secure information for its own needs as an act of self-determination and essential governance, and it presents some of the key findings from that exercise. As the Indigenous rights agenda shifts from the pursuit of restitution to the management and implementation of benefits, those with proprietary rights are finding it increasingly necessary to build internal capacity for post-native title governance and community planning, including in the area of information retrieval and application. As an incorporated land-holding group, the Yawuru people of Broome are amongst the first in Australia to move in this area of information gathering, certainly in terms of the degree of local control, participation and conceptual thinking around the logistics and rationale for such an exercise. An innovative addition has been the incorporation of survey output data into a Geographic Information System to provide for spatial analysis and a decision support mechanism for local community planning. In launching and administering the 'Knowing our Community' household survey in Broome, the Yawuru have set a precedent in the acquisition and application of demographic information for internal planning and community development in the post-native title determination era.

**Keywords:** Indigenous population survey, demography, census, community development.

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## Acronyms

|         |  |
|---------|--|
| ABS     | Australian Bureau of Statistics  |
| ALT     | Aboriginal Lands Trust   |
| ANU     | The Australian National University   |
| CAEPR   | Centre for Aboriginal Economic Policy Research                             |
| CEO     | Chief Executive Officer  |
| GIS     | Geographic Information System  |
| GST     | goods and services tax   |
| FaHCSIA | Department of Families, Housing, Community Services and Indigenous Affairs |
| ILUA    | Indigenous Land Use Agreement  |
| KLC     | Kimberley Land Council   |
| LNG     | liquefied natural gas  |
| NBY     | Nyamba Buru Yawuru   |
| PES     | Post-Enumeration Survey  |
| PSMA    | Public Sector Mapping Agency   |
| YKC     | Yawuru 'Knowing Our Community' (Survey)                                    |

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## Introduction

A significant irony is emerging in regard to the collection of social statistics on Indigenous peoples in Australia. At no time has there been such a volume and range of data on something called ‘the Indigenous population’, mostly as a consequence of efforts by the Australian Bureau of Statistics (ABS 2007), and yet there remains a dearth of information on the various sociocultural entities that make up that population (Taylor 2009, 2011). As a consequence, in matters that are crucial to the interests of variously constituted Indigenous polities, we are increasingly information rich but invariably knowledge poor. So much so, in fact, that one prominent Aboriginal leader was compelled to observe at a recent conference on the National Aboriginal and Torres Strait Islander Social Survey:

The view I have about data is a long way from the current paradigm where data is collected on Indigenous society by governments for their purposes, not to support the objectives that Indigenous people want to determine. I share a pervasive Indigenous aversion to the way data is collected by governments, academics or professional researchers on or about Aboriginal people. ...despite the wealth of empirical data dished up by countless inquiries, Royal Commissions and research projects over many decades about the social and economic condition of Aboriginal society, little practical benefit seems to come from all this data. Th[e] categories are constructed in the imagination of the Australian nation state. They are not geographic, social or cultural spaces that have relevance to Aboriginal people (Yu 2011).

This paper presents a case study of an attempt to reverse this paradigm. It sets out the background events that led the Yawuru Native Title Holders Aboriginal Corporation through its development company (Nyamba Buru Yawuru—NBY) to address its own demographic information needs as an act of self-determination and essential community governance via a comprehensive survey of Indigenous households in Broome. An important and innovative feature of this exercise has been the incorporation of the resulting survey data into a Geographic Information System (GIS) that provides NBY with a capacity to identify and approach community planning issues from an added spatial perspective.

As the Indigenous rights agenda gradually shifts from the pursuit of restitution to the management and implementation of benefits, those with inherent and proprietary rights are finding it increasingly necessary to build internal capacity for community planning including in the area of information retrieval and application in a post-native title determination society. As an incorporated land-holding group, the Yawuru people of Broome are amongst the first in Australia to be active in this area—in terms of their degree of local control, participation and conceptual thinking around the logistics and rationale for

such an exercise. In launching the Yawuru ‘Knowing our Community’ (YKC) household survey in Broome 2011, it is fair to say that the Yawuru set a precedent in the acquisition of vital information by insisting that this be to serve their internal purposes as well as to enable representation of their own priorities and circumstances to the outside world. In effect, new governance arrangements in the post-native title determination era should inevitably be informed by locally controlled and customised information. This paper provides an indication of how this can be done.

## Native title and statistics in Broome

The determination of native title rights in and around the fast-growing town of Broome produced an unparalleled agreement between a native title holding group and a government in Australia. In August 2010, the Yawuru Area Global Agreement was registered as a formal resolution to issues arising out of the Rubibi 6 (2001) and Rubibi Community (2006) native title claims, thereby finalising a 16-year process of native title claim preparation, mediation, bitter litigation and successful negotiation by Yawuru native title holders. This settlement of Yawuru native title lands was signed by the Shire of Broome, the State of Western Australia, Yawuru Native Title Holders Aboriginal Corporation (as the Registered Native Title Body Corporate) and its commercial and management arm (NBY). Valued at almost \$200 million as a combined land and financial package, the Global Agreement, in the form of two Indigenous Land Use Agreements (ILUAs), secures Yawuru as a prime equity partner in Broome’s economy and in its conservation management and social development.<sup>1</sup> The Agreement sets aside \$20 million for social and affordable housing in recognition of the priority with which Yawuru treat the matter of adequate housing for Aboriginal people in Broome. The agreement also resolved heritage issues affecting land required for future development in and around Broome and it now makes land available for the development of residential and industrial areas, for tourism and for future airport development.

While benefits to the Yawuru people included monetary payments for capacity building, preservation of culture and heritage, economic development, social housing and joint management of a proposed conservation estate, these payments were scheduled up to and including the 2013–14 financial year, thereby creating a very tight timeframe for crucial decision-making. Yawuru were mindful that this funding is miniscule compared to their pressing and growing needs, and that it must be invested strategically. Clear measures of the scale and composition of these needs were urgently required to establish a sound information base for use in negotiations and planning with both public and private investors. In order to develop this capacity, NBY immediately searched for available statistical data on basic matters such as the size and socioeconomic

condition of its client population, especially in regard to social housing. While such information was notionally available from the ABS and government agencies, the data were considered unreliable and, in any case, provided no reference to a specifically Yawuru population. Accordingly, NBY itself decided to undertake a comprehensive household survey of the Aboriginal and Torres Strait Islander population of Broome, many of whom it knew would be Yawuru. While the original intent was to also include the many Yawuru people who live in other towns such as Port Hedland, Derby, Darwin and Perth—some of whom may consider returning to live in Broome at a future point in time—this group did not form part of the present survey. Plans for counting the diaspora are to be included in future survey work.

In February 2011, NBY contracted the Kimberley Institute (KI) to project-manage the survey. Its role was to design and conduct what became labelled as—the Yawuru ‘Knowing our Community’ (YKC) survey. The intention was to approach every Indigenous household in private dwellings in Broome, as well as all other Indigenous persons in Broome located in either non-private dwellings or homeless, as far as these could be ascertained on the basis of collective local knowledge. In turn, KI commissioned the Centre for Aboriginal Economic Policy Research (CAEPR) at the Australian National University (ANU) to assist by providing advice on the conduct of a survey and by offering training and skills transfer to local survey personnel, as well as assistance with data analysis and report writing.

The YKC survey was conducted between April and July of 2011. It engaged with a total of 997 Indigenous households in private dwellings in the Broome area. Of these, 928 (93%) participated in the survey, and 69 (7%) declined the offer. As for people resident in non-private dwellings or homeless, the survey contacted a total of 249 individuals in various institutions and at camping sites around the town.

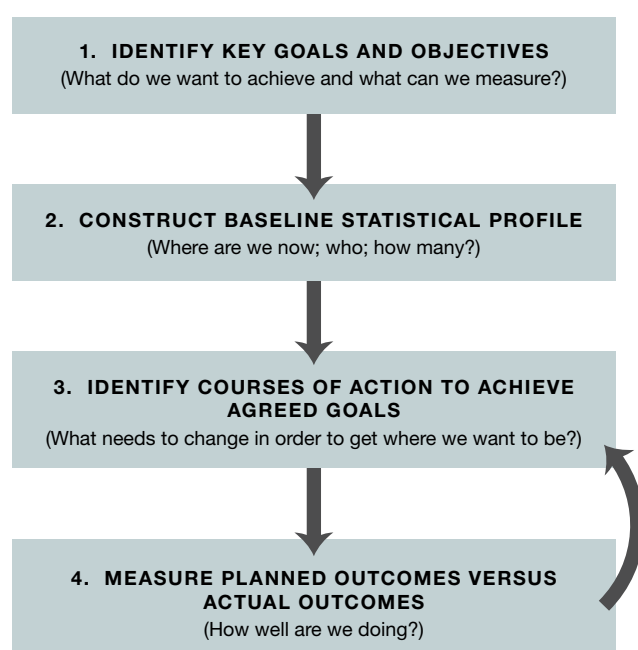
This survey was unique in many ways. It was not the first survey of Indigenous households ever to be conducted in an urban centre, not least in Broome. It was, however, the first survey to be knowingly comprehensive in coverage and to be developed, managed, conducted and controlled entirely by local Indigenous organisations and local Indigenous residents for the primary purpose of informing their own local planning needs. While non-Indigenous staff from CAEPR assisted in a supporting role, the exercise itself can be described as the first truly Indigenous social survey on a whole-of-population scale.

Conceptually, the collection of demographic, social and economic information relating to the Indigenous peoples of Broome was designed to establish an evidence base that would enable Yawuru to embark on a logical sequence of social and economic planning. This emphasis on evidence-based planning underlined an urgent need for accurate

demographic data, not least because there are no official data available for the Yawuru population group/social collective. As we have seen, from a Yawuru perspective, the data that purported to represent the Indigenous population of Broome was determined to be inadequate for their purposes (Yu 2011). This was a significant shortcoming for meaningful community planning because whatever the detail of local plans might be, it is crucial that they are based on reliable estimates for the target population. In terms of programs, it requires reliable breakdown into infants, mothers, school-age children, youth, young adults, middle-aged, and older people. Ideally, it also requires that statistical events in the population (such as employment numbers, school enrolments, housing conditions, hospital separations etc.) are drawn from the same population universe—such that numerators are drawn from matched denominators in the calculation of rates. Unfortunately, in official statistics on Indigenous populations this concordance is not always certain.

From the outset, then, Yawuru required the construction of a baseline unit-record demographic database that would be compiled and controlled locally and validated using local knowledge to ensure complete population coverage against categories that suited the needs of local planning goals. With such a baseline database in place, NBY would be in a position to identify the scale and composition of various courses of action that it might wish to pursue in order to achieve specified goals. It would also be in a position to monitor change over time and measure the degree to which planned outcomes matched actual outcomes at future dates, an important capacity to acquire in such a dynamic region as the West Kimberley. The sequence of steps involved in this process is illustrated in Fig. 1, and within this schema the YKC survey is effectively step 2.

**FIG. 1. Key steps in Yawuru community planning**





The idea of conducting a household survey of Yawuru and other Indigenous households in Broome thus emerged alongside a growing realisation that the successful negotiation of Yawuru native title rights brought with it a set of responsibilities that required Yawuru to develop a rigorous evidence base for its own purposes. This would provide for the rational economic and social use of its freehold and leasehold land for the benefit of Yawuru people and for generating a vision of sustainable and inclusive development for the whole of Broome, including for non-Yawuru. By the time the ILUAs were formally registered in August 2010, discussion and planning for the development of a population survey was already well underway, partly because of the NBY financial obligation to immediately prepare a number of management plans, especially in regard to social and affordable housing.

## Methodology

In September 2010, the NBY Board resolved to undertake a comprehensive population survey of Broome to inform the Board's investment strategy, particularly in relation to social and affordable housing. A two-day workshop was conducted to explore options in December 2010. This involved Yawuru leaders, NBY staff, KI, CAEPR, the Australian Institute of Aboriginal and Torres Strait Islander Studies and the Nulungu Research Institute at the University of Notre Dame Australia, Broome campus. This workshop focused on lessons learnt from previous dedicated surveys of Indigenous communities and on the logistics of conducting a Broome-specific survey. The workshop agreed on the broad objectives for such a survey and on an appropriate methodology; it also developed a budget mostly for hiring local people to form an interview team. Fundamentally, the workshop agreed on the following objectives and methodological principles for the survey:

- The overriding objective was to establish a comprehensive demographic database for the Indigenous population of Broome.
- There would be a critical focus on ascertaining community views on housing issues as a Yawuru priority.
- Other data that Yawuru require (e.g. employment, education and training, health, cultural attachment) would be obtained via subsequent sample surveys that would be enabled by the creation of the comprehensive dwelling and population list.
- Accuracy and efficiency would be ensured by applying local knowledge through the employment of an Aboriginal survey team from the Broome community.

Funding was to be sought from relevant agencies, notably the Western Australian Government (Departments of State Development, Housing and Indigenous Affairs) and the Commonwealth Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA). With an indication of this support in hand, and consistent with NBY's focus on maintaining a lean organisational structure by achieving outcomes through contracting and partnerships, NBY contracted KI to manage the project. The first step in project management was the recruitment of some 20 local Aboriginal people, including highly skilled team coordinators and data managers, to undertake the survey. Those recruited were, as far as possible, representative of Broome Aboriginal society in terms of cultural identity, age and gender (Fig. 2). Following a committal of funds by Commonwealth and State agencies, a survey development and training workshop was held in Broome involving the survey team, KI and CAEPR in April 2011. This workshop resulted in the production of the household questionnaire, a complete residential mapping of all Indigenous dwellings based on local knowledge, and a strategy for systematically conducting the survey across the various neighbourhoods around Broome and in surrounding rural areas. In constructing the questionnaire, the group was conscious of a need to apply standard ABS questions and concepts where possible in order to maintain comparability with official statistical collections. This was especially so in defining usual residents and visitors, although some modification to usual residence rules was allowed in order to represent what became referred to as 'absent residents'. The process of developing these outcomes was entirely interactive and determined by group consensus, an approach that gave the survey team substantive ownership of the survey methodology.

**FIG. 2.** The Kimberley Institute assembles the YKC survey team, Broome, 2011



Photo: Kimberley Institute.

An important mechanism to support enumerators and NBY in their approach to households was the development of a comprehensive communication strategy. This included the adoption of a survey logo for use on publicity posters located in shopping centres, offices and public places (Fig. 3). It also appeared on team uniforms and on the side of a survey team bus that transported interviewers during the daily round of their activities. Alongside this street-level publicity, KI engaged a local Indigenous company, Goolarri Media Enterprises, to produce three promotional videos that were broadcast before, during and at the end of the survey on Goolarri TV. These promotional videos featured survey team members and Yawuru leaders in explaining the reasons for the survey, the manner in which it was to be conducted and how the information that it collected would subsequently be used.

**FIG. 3.** Publicity poster, YKC survey, Broome, 2011



Photo: Kimberley Institute.

The household survey commenced in mid-April and was completed by July 2011. Throughout this period, team members working in groups of four were active each day interviewing heads of households, locating people at workplaces, organising for revisits if dwellings were unoccupied and registering completed forms with KI staff (Fig. 4). These activities were conducted in such a way that the process became an exercise in community development for the survey team members, involving regular debriefings and information-sharing discussions about enumeration strategies and community feedback. Data was entered into an Excel spreadsheet on a dedicated PC platform at the KI office in order that team members could experience the process of data collection and storage from beginning to end (Fig. 5). Initial results from the survey also became the subject of community focus group discussions organised by NBY on issues related primarily to the development of a Yawuru housing policy.

**FIG. 4** Team members interviewing householders, Broome 2011



Photo: Kimberley Institute.

**FIG. 5.** Building the YKC database



Photo: Kimberley Institute.

## Survey background: The limitations of official data

In 2006, the ABS Census counted a total of 2,305 Indigenous people in the Broome Indigenous Area on census night. This was the equivalent area covered by the YKC survey. Of those counted in the census, 2,062 were usual residents of Broome and 243 were visitors from elsewhere. The census also counted a total of 2,337 Indigenous people as usual residents of Broome. This included the 2,062 counted in Broome plus a further 275 individuals who were away elsewhere in Australia on census night. It also recorded a total of 686 households (dwellings) with Indigenous occupants.

While the ABS attempts to enumerate all residents of Australia at census time it does acknowledge that this is never fully achieved. Accordingly, a national follow-up survey of around 1 per cent of all households (the Post-Enumeration Survey, or PES) is conducted one month after each census in an attempt to estimate the numbers missed. Also, for the Indigenous population, some people do not register their Indigenous status on the census form. For usual residents of Broome this number is often substantial: in 2006 it amounted to 1,815—which was almost as much as the usual residence census count of 2,337 Indigenous people. In deriving its post-censal Indigenous (and non-Indigenous) estimates, the ABS reallocates these non-responses to each population category pro rata. Together with the estimate of net undercount from the PES, final Indigenous and non-Indigenous population estimates are then produced for Local Government Areas (total numbers only) and for larger Indigenous Regions (total numbers disaggregated by 5-year age groups and sex). These become the official population figures for local areas and they are used for important public policy purposes such as electoral redistributions, local government fiscal allocations of goods and services tax (GST) revenue, and gross estimation of local service needs.

Thus, in 2006, the Shire of Broome had an official estimate for its usual resident Indigenous population, but the town of Broome did not. In the Kimberley liquified natural gas (LNG) Precinct Strategic Assessment Aboriginal Social Impact Report (Kimberley Land Council (KLC) 2010) this Shire figure of 4,750 was used to create an equivalent Indigenous estimate for the town of Broome by distributing the Shire estimate on a pro rata basis according to the proportional share of the Shire population that was resident in Broome. This provided a synthetic estimate for the usual resident Indigenous population of Broome of 3,123 in 2006.

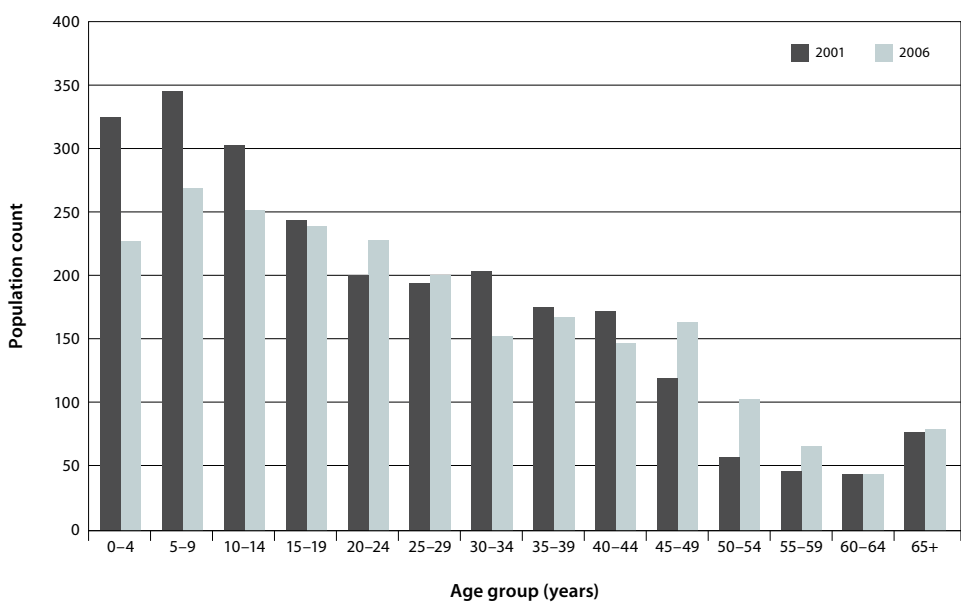
While this estimate was no doubt an improvement on the census count of usual residents, a major drawback was the lack of any benchmark against which its veracity could be tested. It also lacks the other characteristics of the population that accompany the census count—such as age, income, labour force status, education and household characteristics. Although age and sex can be inferred by pro-rating from the Shire-level distribution (as it was in the KLC report), this procedure is subject to error.

In 2010, these various figures provided the official population data available to NBY as it commenced deliberations around its social and economic planning needs. One immediate difficulty that they presented was that the 2006 figure of 2,337 for Broome's usual resident Indigenous population was notably lower than the 2001 count of 2,514 (Fig. 6). Taken at face value, this suggested that the Indigenous population of Broome was in decline, with a 7 per cent drop in resident numbers over the five-year intercensal period. Needless to say, such an outcome was very much at odds with the perception of NBY and others in the Broome community, who had expected to observe a growth—and not a decline—in Indigenous numbers. It was also at odds with the fact that the Indigenous net migration rate over this period was only –5 per cent.

The count of Indigenous persons present in Broome on census night had also decreased, but this time by 15 per cent from 2,717 to 2,305. Furthermore, the 2006 Census count was suggesting a substantial reduction in the resident population in the 0–14 age group of almost 230, or 24 per cent (Fig. 6). While the numbers in town do fluctuate even on a daily basis, substantial decline of this magnitude and composition was difficult to explain. For one thing, over the 20-year period since the late 1980s, the built-up area of Broome had more than doubled, with entire new suburbs created, as illustrated in Fig. 7. Higher numbers were also suggested by other indicators of population drawn from school enrolments and health service usage.

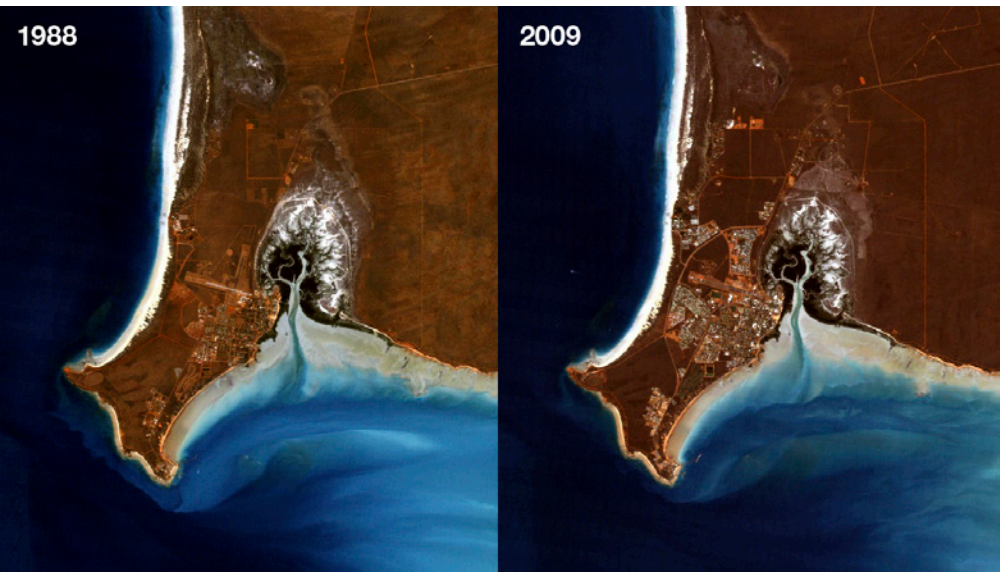


**FIG. 6.** Age distribution of the Indigenous usual resident census count in Broome, 2001 and 2006



Source: ABS Census of Population and Housing 2001 and 2006.

**FIG. 7.** Broome urban area, 1988 and 2009



Source: Geoscience Australia 2011.

While issues of data credibility formed a significant part of NBY's decision to construct its own demographic database, more important was the simple fact that there have never been statistical data available for the social entity 'Yawuru'. To this extent, the YKC survey was both conceived of and designed to satisfy the very specific needs of a native title group for information that suited their specific purposes. In the first instance, this would refer to all Yawuru residents of Broome, whether present or not, but because of cultural obligations and responsibilities to other Indigenous peoples resident in or visiting Broome, to say nothing of the substantial affinal ties that exist between Yawuru and other Indigenous peoples, this inevitably implied a wholesale comprehensive survey of the entire Indigenous population of Broome. The purpose was not to develop measures for comparison with the rest of the Broome population, or with any other population group for that matter. The sole aim was to ensure that Yawuru would have access to the most appropriate and complete information suited to the better understanding and fulfilment of their own aspirations and obligations as major players in the Broome economy and society. In effect it would help them to 'know' their own community and to engage in strategic decision-making in a post-native title determination environment.

Although NBY was therefore focused on customising the collection of data, it was acknowledged that standard ABS definitions and interviewing procedures should apply as far as possible in order to establish some basis for comparison and subsequent benchmarking with information from the national census. Thus, usual residence in Broome was defined as spending an aggregate of more than six months of the year in town. While this could apply to usual residents who were absent, the rules for inclusion of such individuals were different in the YKC survey compared to the ABS census. The YKC survey established the residency status of absent persons indirectly via household respondents, whereas the ABS census determined this directly from absentees at their place of enumeration. A further variation was the adoption of a more inclusive view of usual residence. For example, the ABS census counts children who are away from the parental home for schooling as residents of their place of enumeration. Where respondents considered this to be inappropriate, allowance was made in the YKC survey to count such children as residents of Broome which—physically—they frequently are, even during the school year. The same principle applied to absent workers, many of whom were engaged in fly-in/

fly-out or drive-in/drive-out operations while using Broome as the home base. For benchmarking purposes, it was fortuitous that the YKC occurred in the same year as the 2011 Census, although to ensure that these processes did not overlap, care was taken to ensure that the survey field operations were completed well before the census date in August.

## Select survey results

A primary purpose of the YKC was the establishment of a fully comprehensive population list that would provide (for the first time) a definitive demographic profile of the Broome Indigenous population, and a flexibility in the reporting of that profile according to the particular population subgroups that NBY wished to represent. Thus, for example, there is no simple answer to the question, 'what is the Indigenous population of Broome?'. This is because several population categories can be identified, each of which has its own particular significance. In the ABS census, two categories are provided for:

- A 'usual resident population' (de jure) consisting of people who usually reside in Broome for more than six months of the year (these may be present in that place at census time or enumerated elsewhere);
- A 'place of enumeration population' (de facto) consisting of all persons counted in Broome on census night regardless of their usual place of residence

In the YKC survey, provision was made to identify both of these populations as well as a third category, referred to as 'visitors'. This category recognises that many Indigenous people, especially from other parts of the Kimberley, are often away from their usual residence and are staying in Broome at any one time, but only on a short-term basis. While Indigenous social practice provides ready accommodation for such visitors, who are often kin-related, outside of such arrangements transient people generate a pressing need for alternate forms of temporary accommodation. Thus, different categories of visitor were identified—those in private dwellings and those in non-private dwellings or camping out. The resulting population and dwelling categories and their associated numbers derived from the YKC survey are shown in Table 1.



**TABLE 1. YKC survey population numbers by population category and dwelling categories, 2011**

|  |       |
|--|-------|
| <b>Persons in Indigenous private dwellings</b>                         |       |
| Indigenous residents present   | 2,904 |
| Indigenous residents absent  | 240   |
| Indigenous visitors  | 317   |
| Non-Indigenous residents present                                       | 214   |
| Non-Indigenous residents absent  | 10    |
| Non-Indigenous visitors  | 7     |
| Indigenous de jure residents declined to participate <sup>1</sup>      | 235   |
| Indigenous de facto residents declined to participate <sup>1</sup>     | 242   |
| Non-Indigenous de jure residents declined to participate <sup>1</sup>  | 17    |
| Non-Indigenous de facto residents declined to participate <sup>1</sup> | 17    |
| Indigenous de jure population in private dwellings                     | 3,379 |
| Indigenous de facto population in private dwellings                    | 3,463 |
| Total de jure population in Indigenous private dwellings               | 3,620 |
| Total de facto population in Indigenous private dwellings              | 3,684 |
| <b>Indigenous persons in non-private dwellings/camping out</b>         |       |
| Residents  | 90    |
| Visitors   | 159   |
| TOTAL Indigenous persons in non-private dwellings                      | 249   |
| TOTAL Indigenous de jure population                                    | 3,469 |
| TOTAL Indigenous de facto population                                   | 3,712 |
| TOTAL Indigenous service population                                    | 3,945 |
| TOTAL potential Indigenous service population <sup>2</sup>             | 8,763 |

Notes: 1. Estimated by the application of average occupancy rates from participating households.  
2. Estimated as Indigenous service population minus current Indigenous visitors to private dwellings plus estimate of maximum Indigenous visitors to private dwellings from survey question.

Source: YKC survey 2011.

## Population size

The first thing to note is that the Indigenous de facto population recorded as present in Broome by the YKC survey (3,712) was 61 per cent higher than the ABS census count of persons present in 2006 (2,305). Admittedly, the YKC figure was gathered five years later, but the size of the difference between these figures is too large to be explained by intervening demographic processes alone. While it is true that the YKC survey ran over eight weeks, such an extended period is also common for the ABS enumeration in locations such as Broome (Morphy 2007). In any event, great care was taken in data processing to eliminate duplicate counting that this time-delay may have produced—a practice that is also held in common with ABS data processing (Fig. 8). Therefore, the most likely explanation for the difference in counts is that the YKC survey was far more successful than the 2006 Census in identifying, engaging and eliciting a response from the Indigenous population of Broome. As such, it is likely to be a measure of the relative effectiveness of different enumeration methodologies. This is also reflected in the fact that the YKC survey identified a total of 997 dwellings with Indigenous occupants compared to the 2006 ABS

Census which identified just 686. Even with the growth of Broome in the intervening period, it seems unlikely that Indigenous households would have increased by as much as 44 per cent.

**FIG. 8. Team members getting directions, YKC survey, Broome, 2011**

Source: Kimberley Institute.

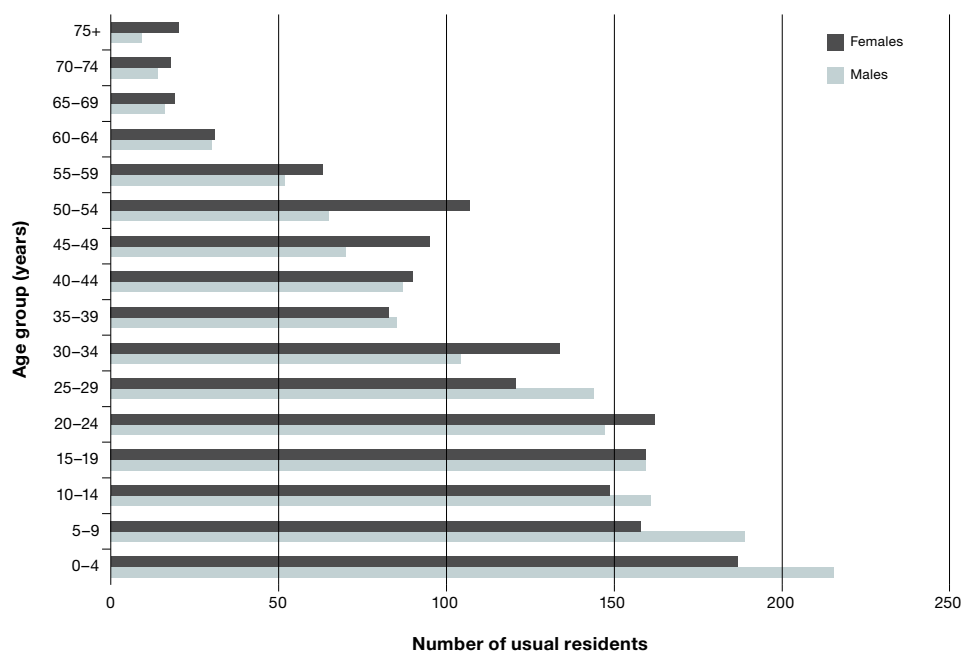
The second point to note is that the YKC count of Indigenous usual residents (3,469) was also much higher (by 48%) than the 2006 Census figure of 2,337. However, some qualification is required here: the ABS adjusts its census count of usual residents to produce a final post-censal estimate which, as we have seen, involves an assessment of census undercount. Although no such estimate is produced for the town of Broome, the synthetic estimate of 3,123 that was calculated for the Kimberley Land Council *Aboriginal Social Impact Assessment Report* (2010) is lower than the equivalent YKC survey figure in 2011 of 3,469—a difference that could well reflect natural increase over the intervening period. Thus, in a rare direct test of the veracity of ABS post-census population estimates, the YKC survey figure would seem to lend support to the general level of the 2006 estimate for Broome that was derived from the ABS calculation for the Shire, although the YKC survey figure is still 11 per cent higher.

A third point to note, from a NBY perspective, is that the real population number for planning purposes is what is termed here ‘the Indigenous service population’. This is basically the sum of all Indigenous people associated with Indigenous households in Broome plus Indigenous people located in non-private dwellings in Broome or camping out at any one time. This number is larger again at 3,952. In fact, recognising that visitor numbers fluctuate over the year and that there are times of peak flow involving larger numbers, the YKC survey went further still and asked each household to estimate the largest number of visitors ever to have stayed at each dwelling at a single time during the past year. This question was used instead of attempting to establish the cumulative flow-through of visitors during the year as the latter figure was considered too difficult for householders to estimate in any reliable way due to problems of recall. A sum of the responses to the substitute question produced a figure of 5,128. If this is added to the existing service population (minus current visitors) then a figure of 8,763 can be derived as a proxy indication of the overall peak potential annual visitor plus resident load on Broome housing, services and infrastructure. This, of course, is an artificial construct as not all visitors would be present at the same time (although something approaching this can occur on occasion). It is provided simply to establish some quantitative basis for a discussion of the likely overall upper scale of annualised pressure on housing.

Finally, survey respondents were asked to nominate their primary language group affiliation and that of other household members, as well as any other language group affiliations that individuals may have with an option for up to four categories. At least one language group affiliation was recorded for fully 97% of the survey population. Yawuru was the largest of these, accounting for more than a quarter (28%) of the usual resident population (excluding those who did not participate in the survey). In addition, 14 per cent of visitors also recorded a Yawuru language affiliation. Not surprisingly, given the emergence of Broome as a major Kimberley service centre, this survey question uncovered the complexity of Indigenous residency, with more than 50 other language groups reported, some more common than others. Bard, for example, was very prominent, as were other affiliations to the Dampier Peninsula and wider West Kimberley region. Beyond this, language affiliations to the Fitzroy Valley region and the East Kimberley featured, as did connections south to the Pilbara, Yamatji and Noongar country. Other reported language groups were from all across Australia, especially the Northern Territory and Torres Strait. The point to note is that while Yawuru are the single most prominent group, many other Indigenous groups reside on and visit Yawuru country, to say nothing of the majority non-Indigenous population.

## Age distribution

Aside from overall numbers, it is the distribution and structure of the population by age and sex that has major implications for social and economic planning, both in terms of assessing current needs of select target groups and in determining the future composition of needs as different cohorts age. Fig. 9 shows the distribution of the Indigenous usual resident population of Broome by age and sex, including those in private dwellings, those absent from private dwellings, and those in non-private dwellings or homeless. Several features in this age distribution are worthy of note. First, the broad base of those aged 0–4 years relative to those aged 5–14 years is suggestive of current high fertility, resurgent after recent decline—although it may also reflect some age misreporting. Second, the rapid taper with advancing age highlights continued high adult mortality, especially among males. Third, relatively large numbers of women in the child-bearing ages, and even larger cohorts beneath them, indicate high potential for future growth in numbers, even if the actual fertility rate were to decline. Finally, there is a preponderance of women over men in over-35 age groups.

**FIG. 9.** Indigenous usual residents of Broome by age and sex, 2011

Source: YKC survey 2011.

For community planning purposes, the significance of these age data is best revealed by grouping them into age ranges that form the focus of policy interest. From the perspective of addressing current educational needs, the Council of Australian Governments' focus on securing universal preschool access and proposals for extending compulsory schooling through to age 17 under 'learn or earn' programs, suggests a number of relevant groups. First of all are those of infant age (0–3) followed by those in preschool and transition years (4–5). Presently, the compulsory school age

in Western Australia is 6–16 years inclusive, although there are proposals to raise this to 17 years. Then there are the transition years from schooling into higher education or the workforce (18–24), followed by the years of prime working age and family formation (25–54) and finally an aged group which is set here at 55 years and over to recognise higher Indigenous adult mortality and morbidity. The size of each of these age groups is shown in Table 2.

**TABLE 2.** Size of policy-relevant age groups in Broome: Indigenous usual residents, 2011<sup>1</sup>

| Policy/age group             | Number <sup>2</sup> | Percentage of usual resident population |
|------------------------------|---------------------|---|
| Infant (0–3)                 | 280                 | 8.7                                     |
| Pre-school (4–5)             | 162                 | 5.0                                     |
| Compulsory school age (6–16) | 728                 | 22.7                                    |
| Broad school age (4–17)      | 959                 | 29.9                                    |
| Young adult (18–24)          | 421                 | 13.1                                    |
| Young adult (25–34)          | 522                 | 16.2                                    |
| Middle adult (35–54)         | 709                 | 22.1                                    |
| Old adult (>55)              | 319                 | 10.0                                    |

Notes: 1. This excludes an estimated 235 usual residents who declined to participate in the survey as well as 23 usual residents with no reported age. One way to incorporate these into the numbers by social policy age group would be to pro rata them using the observed distribution above. This means that the 0–3 age group would become 300; 4–5: 174; 6–16: 781; 4–17: 1,029; 18–24: 452; 25–34: 560; 35–54: 761; and >55: 342. The table population for this more accurate expanded group is 3,469.  
2. Table columns sum to greater than the table population due to overlap between the compulsory and broad school age groups.

Source: YKC survey 2011.

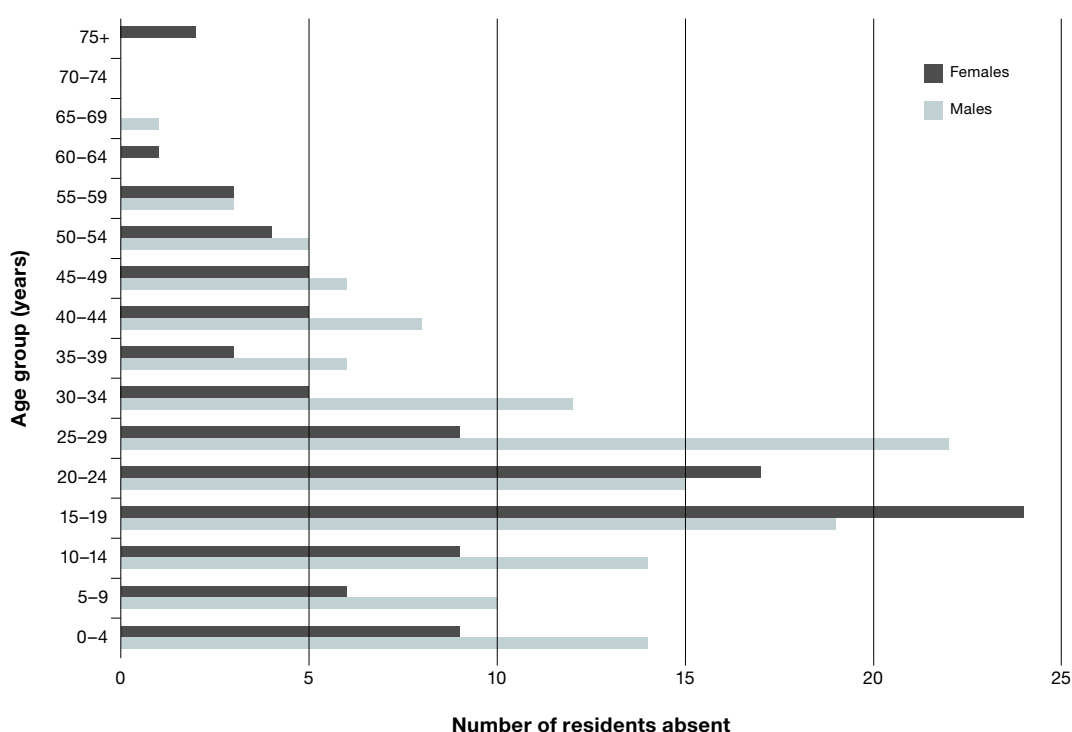
In any discussion or assessment of community planning needs, these sorts of cohorts, whether comprised of residents or visitors or various combinations of these, provide the base quantum net of any subcohort characteristics (such as special needs students) that might imply particular requirements. A basic argument is that there is a need to consider the implications of cohort progression. The most pressing example of this is to contemplate overall community outcomes in Broome in 20 years' time, when those currently aged 35–54 years become a smaller group aged 55 years and over, while, in turn, they are replaced by the larger block currently aged 18–34 that will become the future working and parental group aged 35–54. What educational and training needs for succession do these shifts imply? The same question may be asked of the large block of current school-age children (almost 1,000 in total).

## Movement in and out of Broome

One of the difficulties encountered in accurately enumerating and portraying the Indigenous population of Broome is the high level of mobility and consequent population turnover that occurs on a daily, weekly, fortnightly, monthly, seasonal and irregular basis in and out of town (Prout & Yap 2010). Those who count themselves as residents of Broome are often away elsewhere for a variety of periods of time and for a variety of reasons to do with work, education, training, holidays, social visits, funerals, shopping and accessing services. Others, who are usually resident elsewhere, often visit Broome also for varying periods of time and for much the same mix of reasons.

The YKC survey provides a window into these movements and enables profiling of constituent elements. For example, the age distribution of usual residents who were absent from Broome at the time of the survey is shown in Fig. 10. This shows that at the time of the survey there was a clear concentration of absentees in school-age years, especially at secondary level, as well as among young adults, while relatively few old people were away from Broome.

**FIG. 10. Indigenous absent usual residents of Broome by age and sex, 2011**



Source: YKC survey 2011.

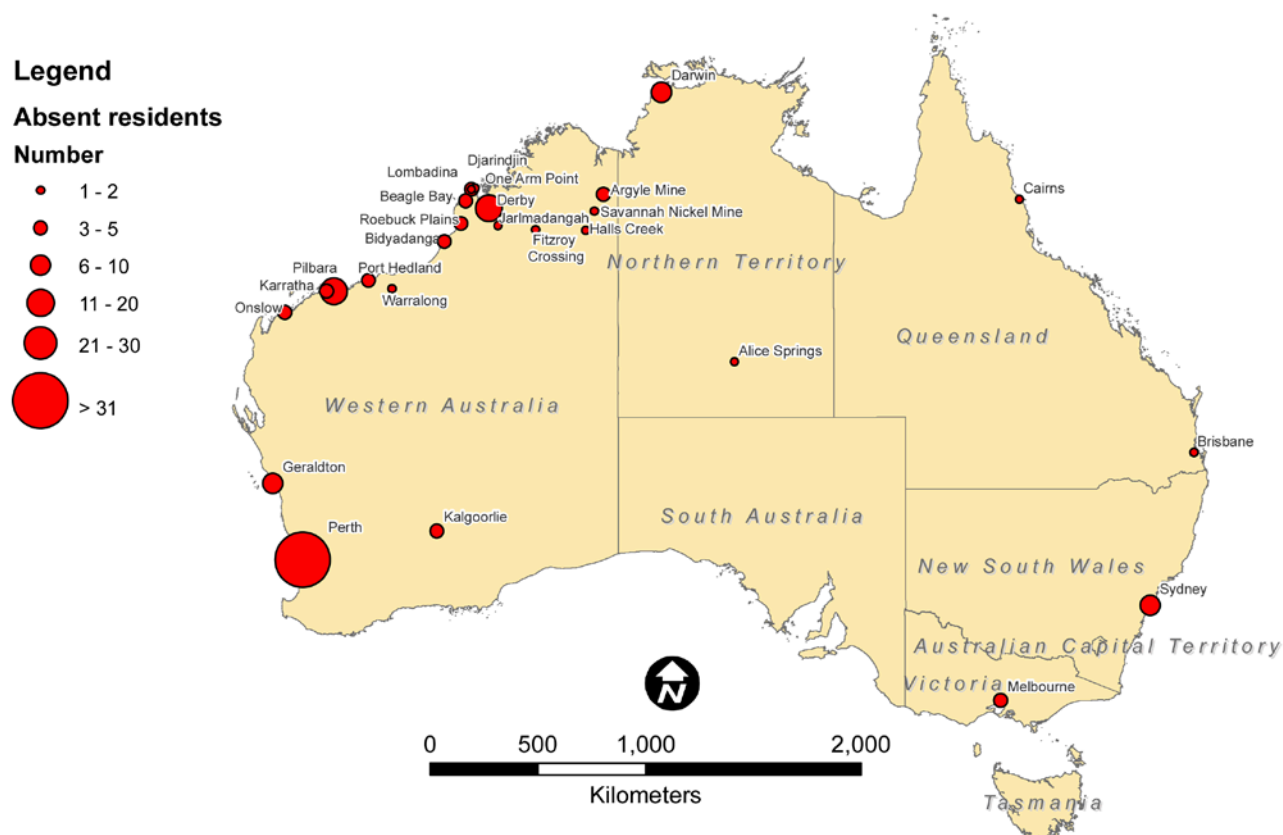
The other feature to note is that most absent residents were male. This age and sex distribution is largely a product of the major reasons for absence that were provided by household respondents on behalf of absent residents. These were (in declining rank order) education, training and employment, social visits and medical reasons. As noted, the identification of absent residents in the YKC survey varied from standard ABS practice by counting children who were away from the parental home for schooling reasons as resident. While ABS practice is to count these as residents of the host locality, respondents to the YKC survey viewed them as very much part of the Broome community and, indeed, they were often reported as present in Broome during the school year. This also applied to many absent workers who were engaged in fly-in/fly-out or drive-in/drive-out operations while using Broome as the home base. The locations of these absent Broome residents reflect these varied activities (Fig. 11).

Clearly Perth is a major destination, especially for schooling, as are major mining regions such as the Pilbara, Kalgoorlie and the East Kimberley for employment. Other capital cities such as Darwin, Sydney, Melbourne and Brisbane also feature as destinations. In contrast, local interaction across the Kimberley appears relatively limited (apart from Derby), certainly when compared to the inflow

to Broome of visitors from the immediate region, as we shall see.

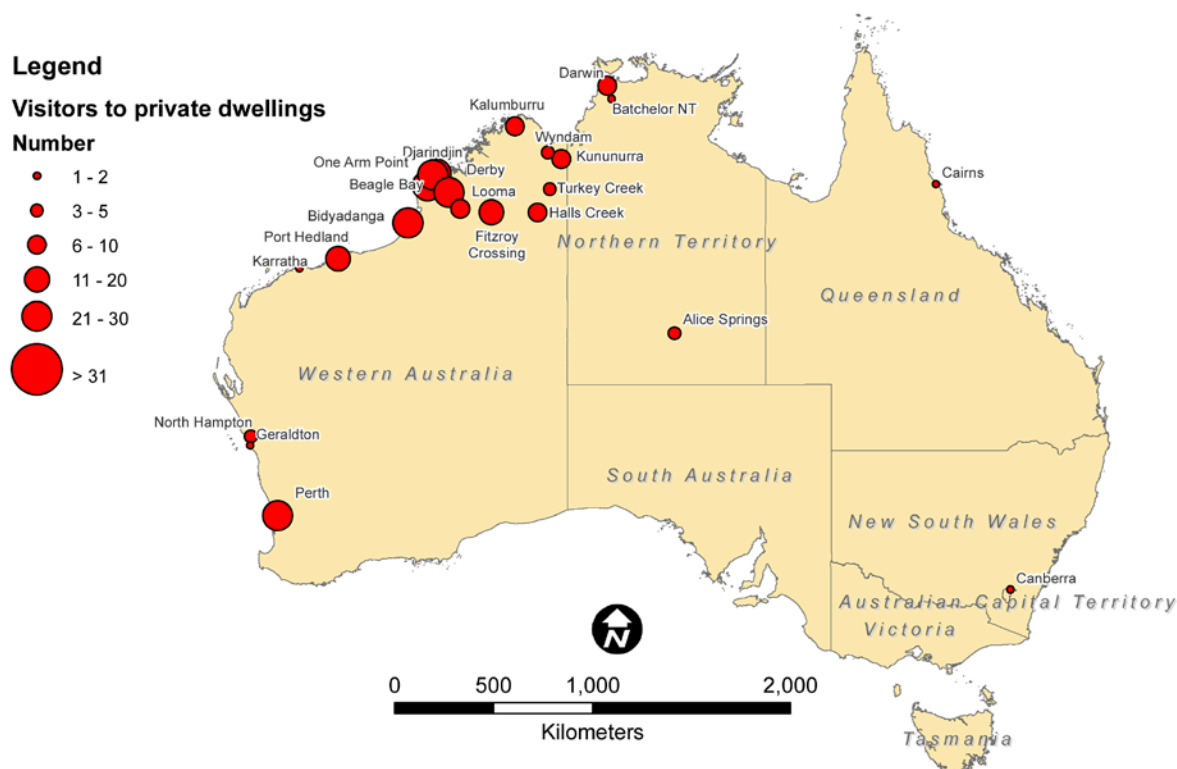
The origins of Indigenous visitors to Broome vary somewhat according to whether they are accommodated in private dwellings, and therefore basically staying with relatives, or whether they are accommodated in an institutional setting, such as a hostel, or camping out with no basic shelter provision. Those staying in private dwellings originate mostly from the immediate West Kimberley region, especially from One Arm Point, Bidyadanga, Beagle Bay and Djarindjin, while a further group is sourced from Kimberley locations further away including Derby, Fitzroy Crossing, Kununurra, Kalumburu, Looma and Halls Creek (Fig. 12). However, substantial numbers also originate from other urban centres in Western Australia, notably Perth, Geraldton, Port Hedland and Kalgoorlie, as well as from other States and Territories. Interestingly, this pattern is partly reflective of the Yawuru diaspora. In contrast, visitors to Broome who are accommodated in non-private dwellings or who are camping out reveal a distinct inflow from all parts of the Kimberley, especially from Bidyadanga, Fitzroy Crossing, Derby, Balgo and Djarindjin, reflective of the fact that individuals and families from across the region frequently access the town as a key Kimberley service centre (Fig. 13).

**FIG. 11. Location of absent Broome residents, 2011**

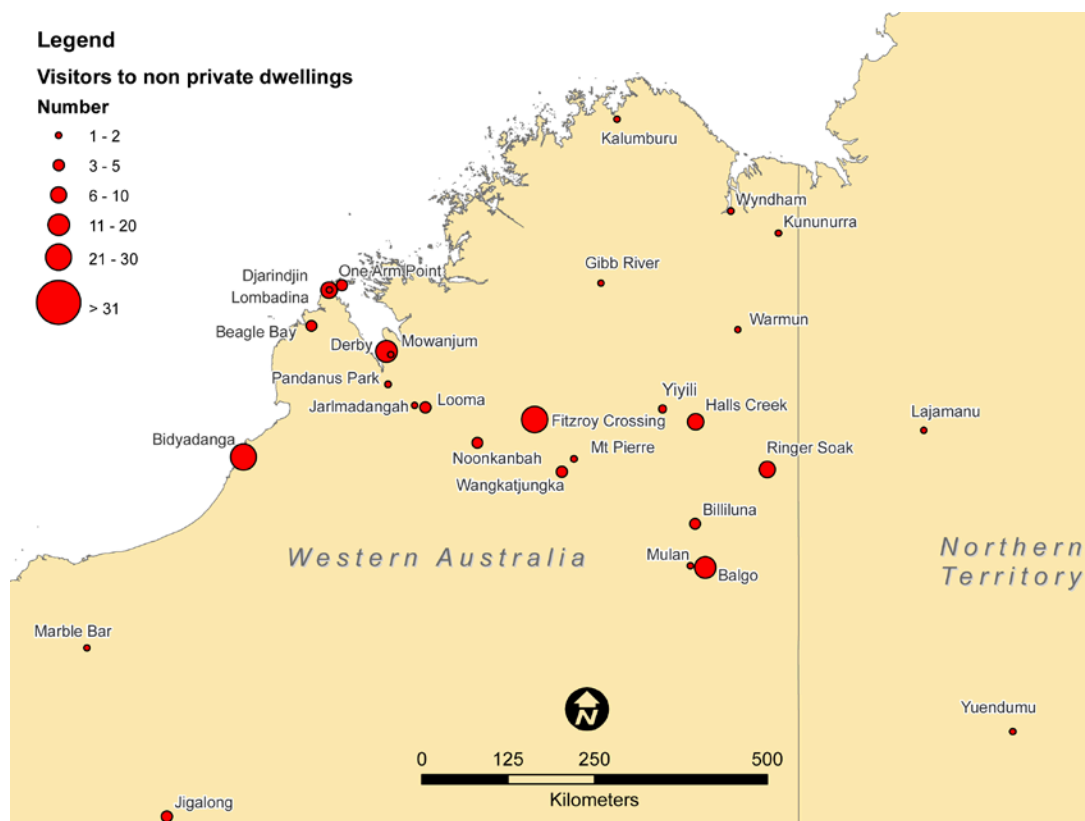


Source: YKC survey 2011.



**FIG. 12.** Origins of Indigenous visitors in private dwellings, Broome 2011

Source: YKC survey 2011.

**FIG. 13.** Origins of Indigenous visitors in non-private dwellings and camping areas, Broome 2011

Source: YKC survey 2011.

The combined demographic effect of these movements of residents and visitors into and out of Broome over an annual cycle is difficult to establish in terms of the annual load that it places on service providers and infrastructure. Suffice to say, a basic cross-sectional count of the Broome Indigenous population at any one time is insufficient in representing this. As noted in Table 1, the YKC survey attempted to establish such an estimate by gathering information on the maximum number of visitors to each dwelling during the year prior to the survey. In effect, this technique suggests that the 'potential' Indigenous population that is serviced by Broome over an annual cycle (in so far as individuals who spend time there either directly or indirectly make use of town facilities) is likely to be more than twice the size of the resident population at any one time. As a consequence, any base estimates of need that are derived from cross-sectional data are almost by definition conservative.

### **Spatially-enabled community development planning**

In recent years there has been a growing adoption of GIS technologies for use as a decision support system in socioeconomic analysis and planning across public and private sector agencies (Haynes, Lovett & Sünnerberg 2003; Hugo 2001). In Australia, these trends have given rise to an increasing number of 'spatially-enabled' government departments and agencies that have the capacity to generate high-quality spatial data and establish clear procedures for custodianship, data sharing and analysis. The Geocoded National Address File (G-NAF) is a good example of these developments. The concept of an authoritative national address file evolved from 1995 onwards and developed with contributions from numerous Commonwealth, State and Territory agencies, as well as statutory bodies such as the Australian Electoral Commission and Australia Post. It now houses over 13 million accurately geocoded addresses and is regarded as the definitive national address dataset (Public Sector Mapping Agency 2012). The G-NAF has a wide range of applications in community planning and has been used to generate additional spatial data products such as the ABS Meshblocks—a new microscale component of ABS census geography that is now being used in the processing of census data and all other ABS spatial data outputs as the basis of the new Australian Standard Geographical Classification (ABS 2011).

While these developments have gathered pace, to date there has been little attempt to consider their application to Indigenous community planning. One of the key features, therefore, of the YKC survey and its resultant database, is an ability to link this database with the G-NAF within a GIS in order to generate new spatial perspectives on community planning issues. This linking of the YKC database with the

G-NAF is a significant innovation as it opens up numerous avenues for targeted spatial analysis at the local level and it provides NBY with the means to develop a sophisticated decision support system. In short, NBY is in the process of becoming as spatially enabled as many larger agencies and it is now in a position to bring issues to the table that have hitherto been beyond reach. Before presenting some examples of this GIS application it is instructive to consider how the matching of survey data to the G-NAF presented some issues of its own, as it is likely that these are more widespread in locations where Indigenous populations have a significant presence.

### **Where do people live in Broome? Matching the YKC to G-NAF**

In building the NBY GIS a number of steps were undertaken to geocode the YKC survey data (Table 3). The first of these involved an address locator to match Indigenous dwellings in the survey to the G-NAF. This resulted in 635 (68.5%) dwellings being successfully geocoded. As indicated in Table 3, the second step involved removing housing unit separators from the survey data address field to better align individual households with the G-NAF format. This step enabled geocoding of a further 138 dwellings thereby raising the level of geocoded households to 83.5 per cent. At this point, manual techniques were required to geocode the remaining households on a case-by-case basis. This accounted for a further 89 dwellings, which meant that a total of 59 dwellings (6.5% of the total) could not be found in the G-NAF. It is significant to note that the vast majority of these were located in Aboriginal Land Trust (ALT) areas and in well-known camping sites around the urban area, as this raises the prospect that a similar omission from the G-NAF may apply across the country in locations where Indigenous land tenure and living areas prevail. The location of these sites in Broome was determined by generating a GIS layer using ALT tenure maps and then by applying a combination of Google Earth imagery and collective community knowledge to identify individual dwellings and other domiciles. This final procedure raised the final level of geocoding of dwellings to 99.2 per cent, which represents a very high 'hit rate' for address matching by any standards.

### **NBY GIS applications**

The geocoding of survey dwelling and household information as a foundational layer in a dedicated NBY GIS establishes for the first time a platform for raising and interrogating spatial relationships within Broome between demographic and other variables as a means to support social policy decision-making. The first opportunity that the NBY GIS provides for is the construction of a more socially informed map of Broome neighbourhoods. This was developed by the YKC survey team using cognitive mapping and a simple digitisation of the overlay boundaries drawn onto a street map of Broome as agreed

collectively by the team. In the process of developing the survey strategy, the survey team collectively identified neighbourhoods that had local relevance in terms of known concentrations of Indigenous households as opposed to areas where these were more dispersed amongst other households. This formed the spatial framework for the survey field operations. In ABS collections, the equivalent category to date has been the Collection District, which is a purely administrative construct based on the determination

of a reasonable enumerator dwelling load which is then allocated to individual census collectors. While the YKC approach was somewhat similar, the starting points for allocation were these various social spaces within Broome that were established from a more colloquial perspective. Altogether, 16 such 'neighbourhoods' were identified and these have been entered into the NBY GIS as one of the many spatial layers upon which the survey results can now be reported. The configuration is shown in Fig. 14.

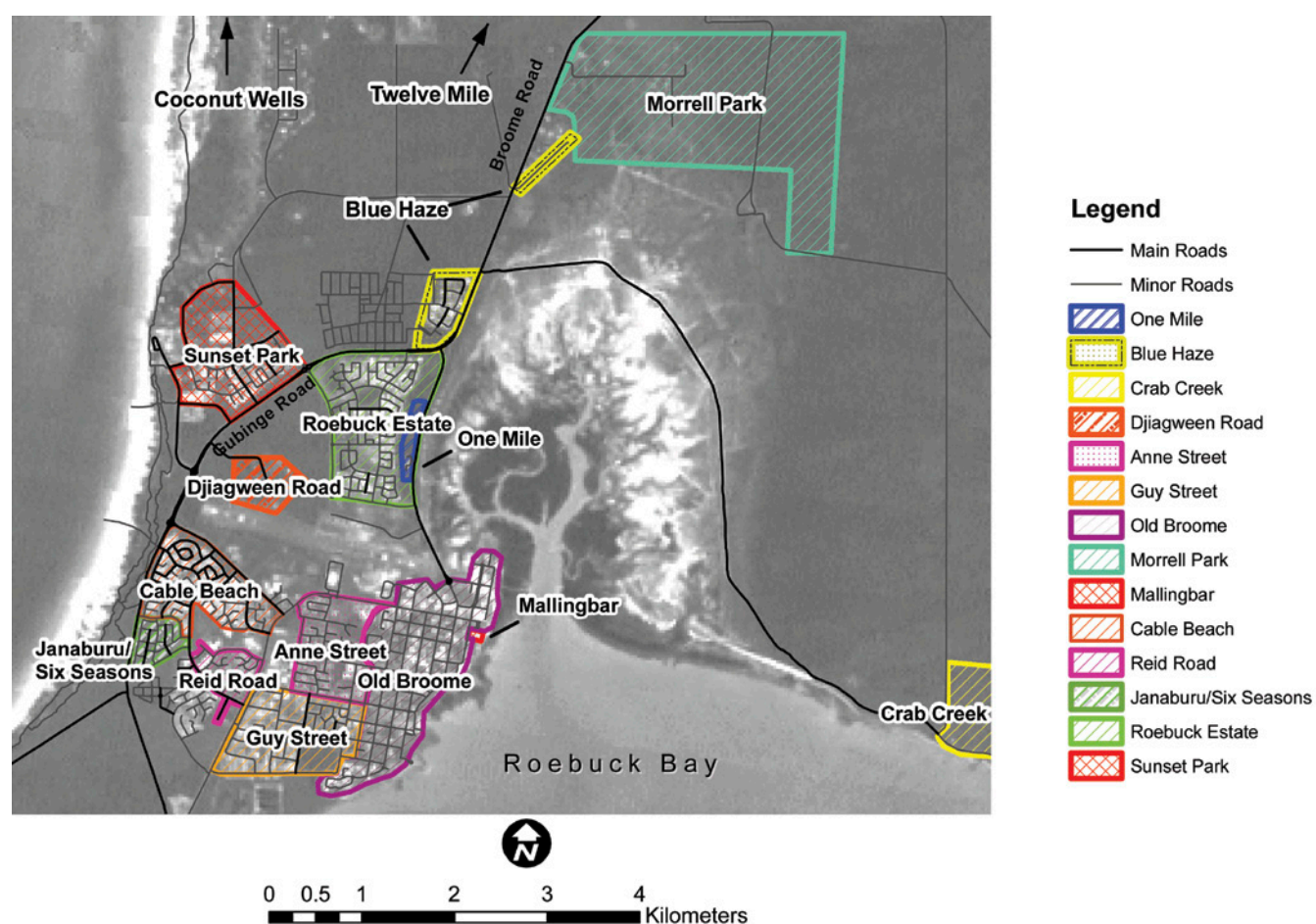
**TABLE 3.** Steps in matching YKC survey data to G-NAF

|   | Number of dwellings geocoded | Percentage of dwellings geocoded |
|---|------------------------------|----------------------------------|
| Geocoded using address locator and G-NAF as reference data  | 635                          | 68.4                             |
| Unit separators removed (e.g. Unit 5/5 Smith Court), address locator re-run                           | 138                          | 83.3                             |
| Manual Geocoding of remaining records-manual matching of G-NAF using Google Earth and local knowledge | 921                          | 99.8                             |

Notes: Dwellings coded for initial analysis were drawn from the 923 households that participated in the survey.

Source: YKC survey 2011.

**FIG. 14.** YKC survey neighbourhoods, Broome, 2011



Source: YKC survey 2011.

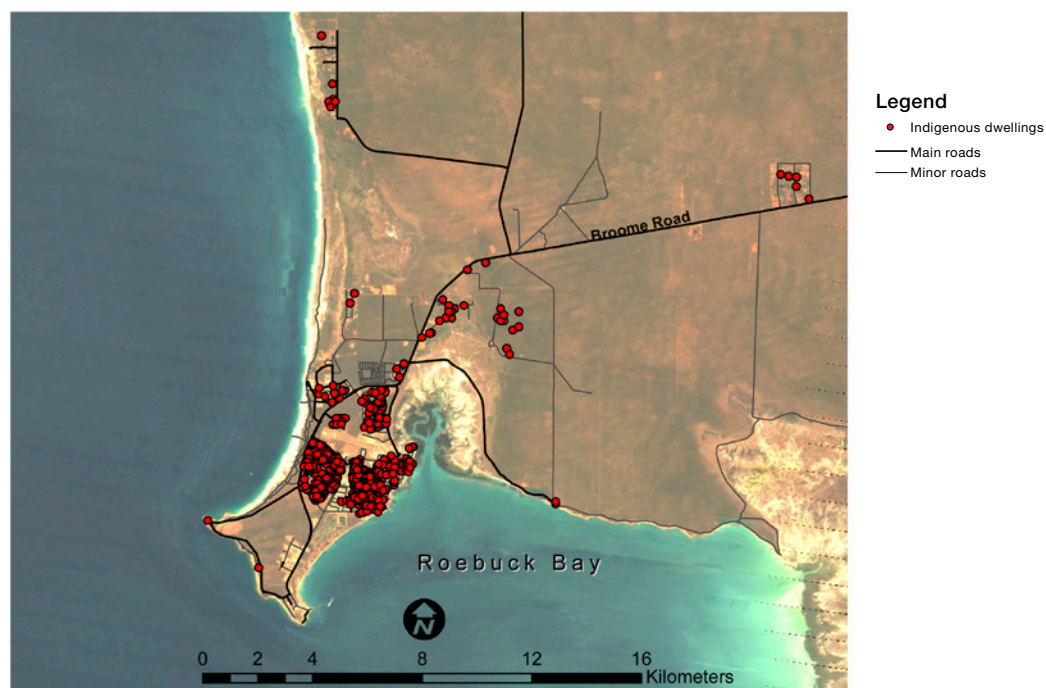
## Population concentrations

Another such layer is provided by the collective distribution of individual dwellings across Broome and its rural hinterland, as shown in Fig. 15. The accurate geocoding of survey data provides the core component within the NBY GIS and it lays a foundation for all subsequent system inquiries linked to housing and population. As can be seen, most Indigenous dwellings are located within the Broome urban area, but there are also notable rural outliers, especially at Morrell Park. Within the town area itself distinct concentrations occur and this is best displayed in sequence looking through Figs 16–18. Here we see that the location of Indigenous dwellings is focused on the old part of Broome and in the southern part of Cable Beach suburb. Fig. 16 shows the actual locations of Indigenous dwellings compared to those of all other dwellings, while Fig. 17 displays Indigenous dwellings according to numbers of Indigenous residents. The latter is a little difficult to interpret in a summary way, and so Fig. 18 represents the distribution of the Indigenous population as a density surface of numbers of people per hectare. This reveals a very striking spatial pattern, with two major concentrations

of Indigenous population centred on the Anne Street/ Guy Street area of Old Broome and the Reid Road/Woods Drive area of Cable Beach (Fig. 14). Away from these, the Djiagween Road area stands out, as do One Mile and Mallingbar (Fig. 14).

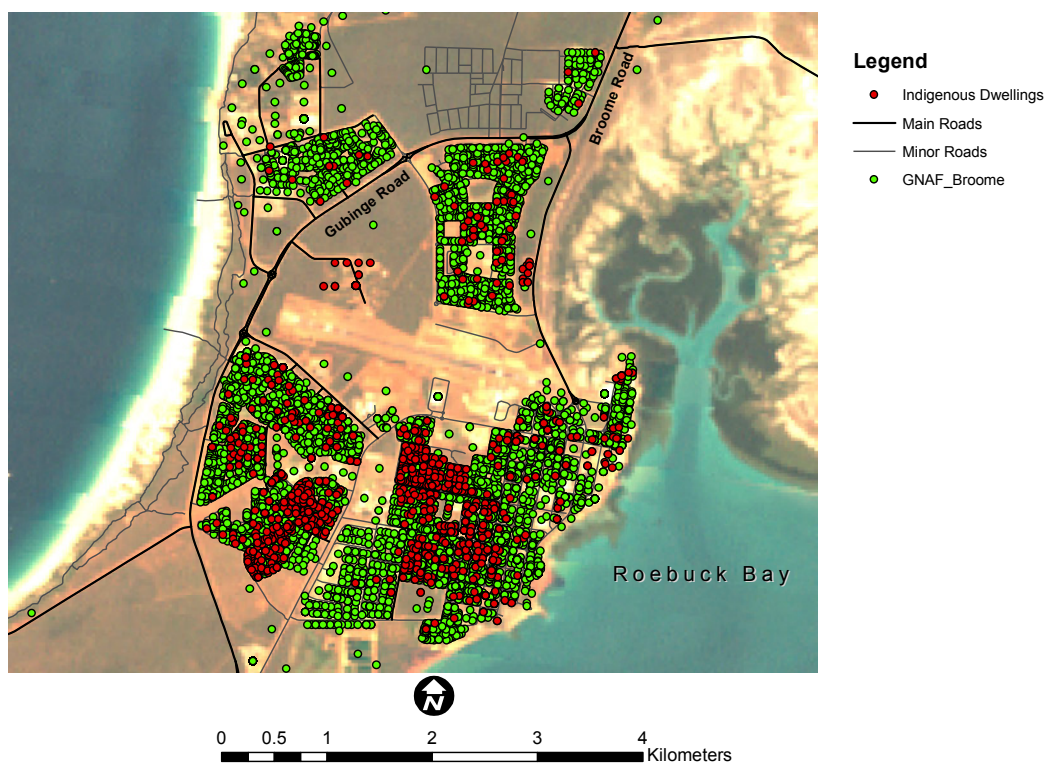
While Fig. 14 also shows Indigenous households elsewhere in Broome (e.g. in Roebuck Estate), the representation here is far less intense. In fact, given the plans for future urban development in Broome (essentially northwards away from the old town), the broad emerging pattern seems to be one of a Broome South that is predominantly Indigenous and a Broome North that is mostly non-Indigenous, leaving aside pockets of Indigenous settlement on ALT lands. This configuration has significant implications for the location of current facilities and services in terms of their physical accessibility to Indigenous residents. It is significant, then, that the creation of the NBY GIS means that any consideration of where to best locate services within Broome can now be informed by a precise measure of this accessibility, and that this can be adjusted to address the needs component parts of the population, such as different age groups.

**FIG. 15.** Location of Indigenous dwellings in Broome and surrounding area, 2011

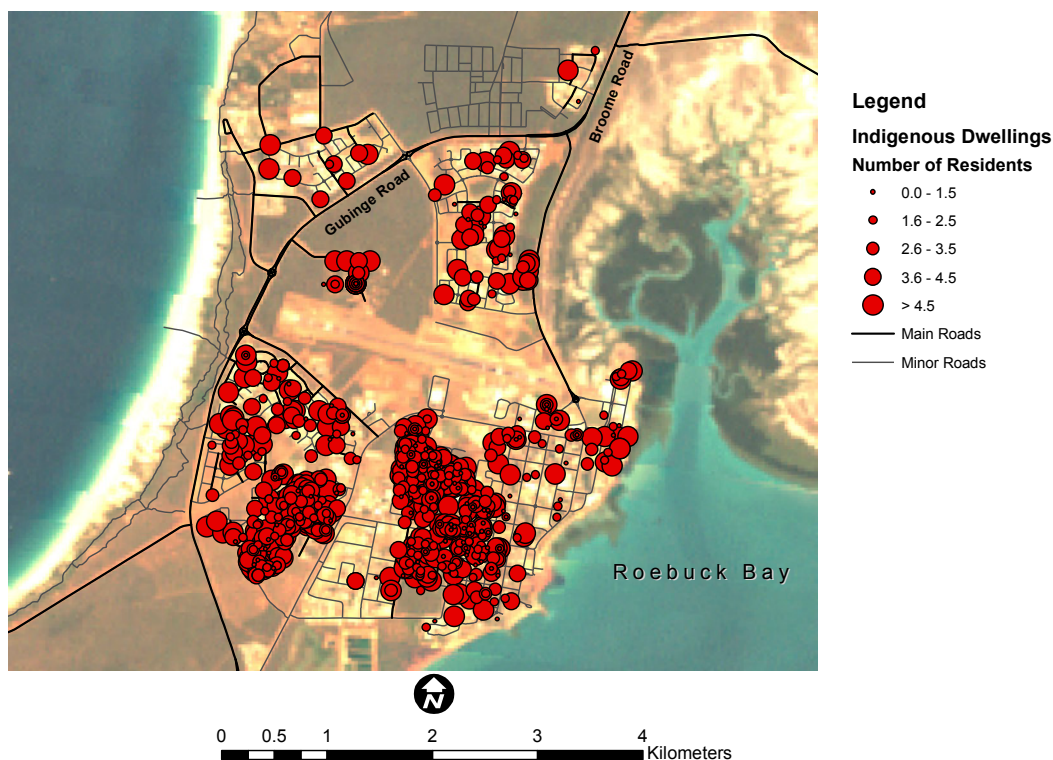


Source: YKC survey 2011.



**FIG. 16.** Distribution of Indigenous dwellings in the Broome urban area, 2011

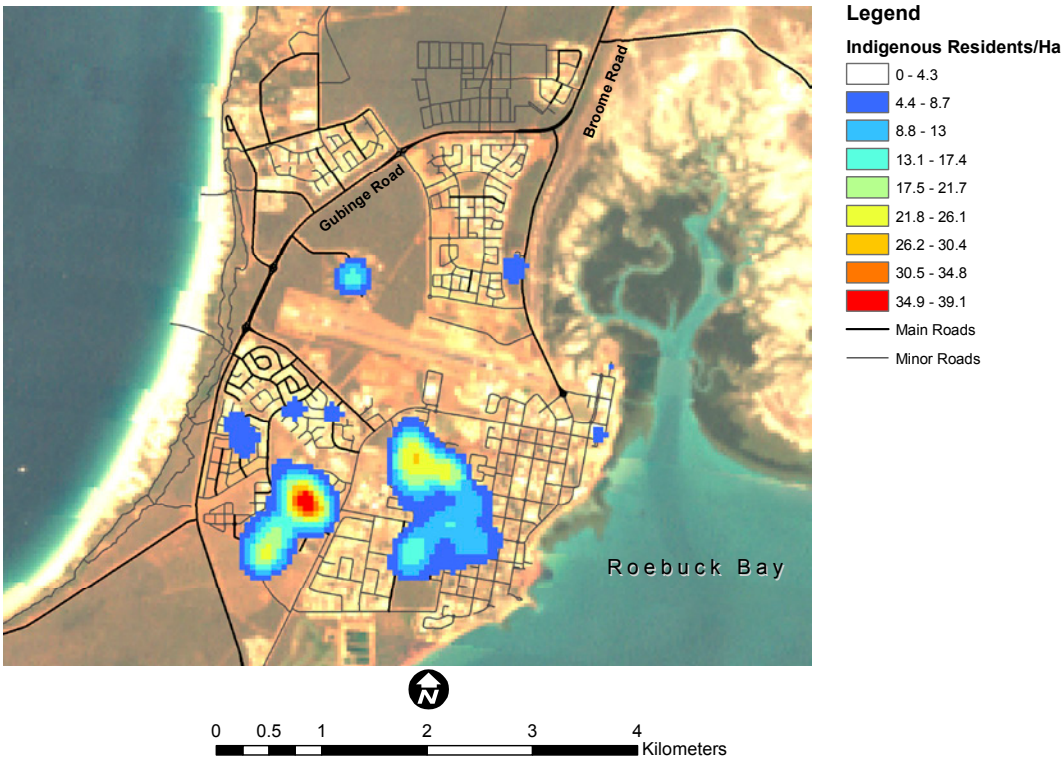
Source: YKC survey 2011.

**FIG. 17.** Distribution of Indigenous population in the Broome urban area, 2011

Source: YKC survey 2011.

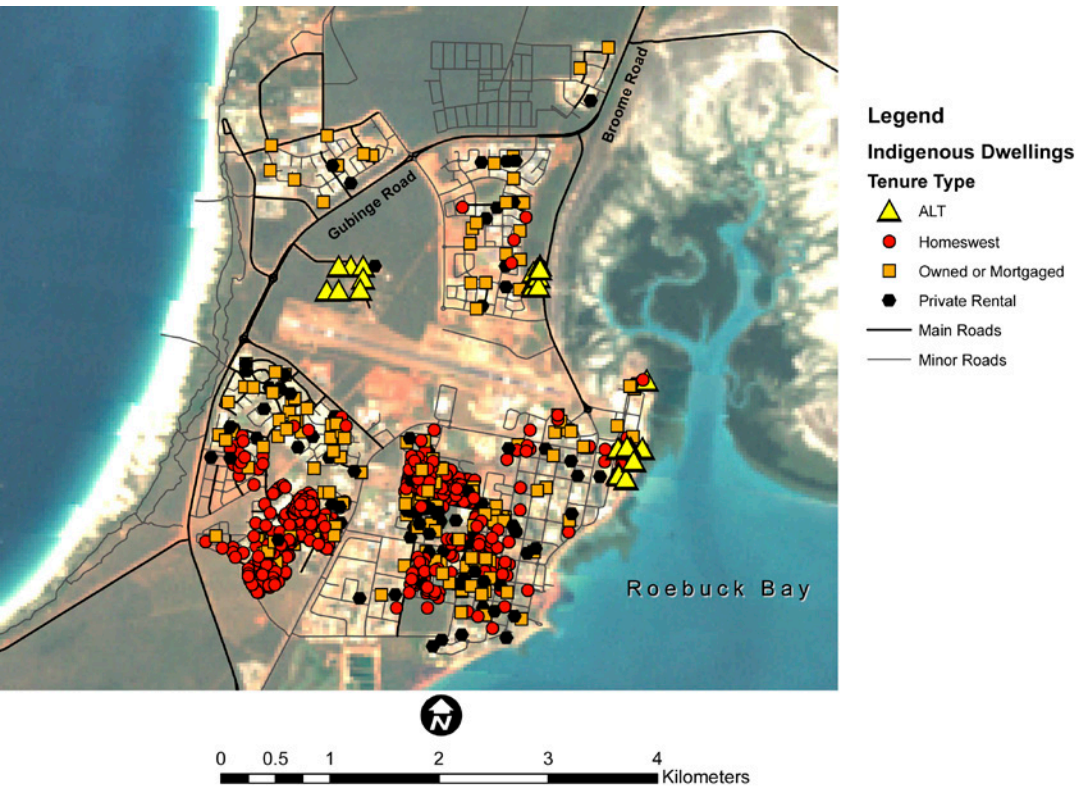


FIG. 18. Indigenous population density in the Broome urban area, 2011



Source: YKC survey 2011.

FIG. 19. Location of Indigenous dwellings by tenure type, Broome 2011



Source: YKC survey 2011.

## Housing tenure

A further GIS layer in the NBY GIS is provided by data on housing tenure. This demonstrates that the concentration of Indigenous population on the south side of Broome is strongly associated with the distribution of Homeswest rental accommodation, as indicated in Fig. 19. The survey revealed that more than half of all Indigenous households in Broome occupy Homeswest dwellings and that the vast majority of these are located in the Anne Street/Guy Street areas of Old Broome and the Reid Road/Woods Drive area of Cable Beach. Many of these households reported and provided details of significant backlogs in house maintenance and, as a consequence, NBY has been able to make representation to the Western Australian Government on their behalf.

Of particular interest for NBY is the survey finding that almost a third of Indigenous householders are in privately-owned or private rental dwellings, and that the distribution of those in home ownership is quite widespread, as shown in Fig. 19. While there is some concentration in Old Broome as a consequence of earlier phases of government rent/buy schemes, Indigenous households have clearly found the capacity to buy in to all parts of Broome, including in the newer developing suburbs in north Broome. A similar pattern emerges in regard to private rental tenure. Information generated by the survey on households who face financial hardship as a consequence of this private tenure has enabled NBY to conduct targeted follow-up discussions regarding potential assistance.

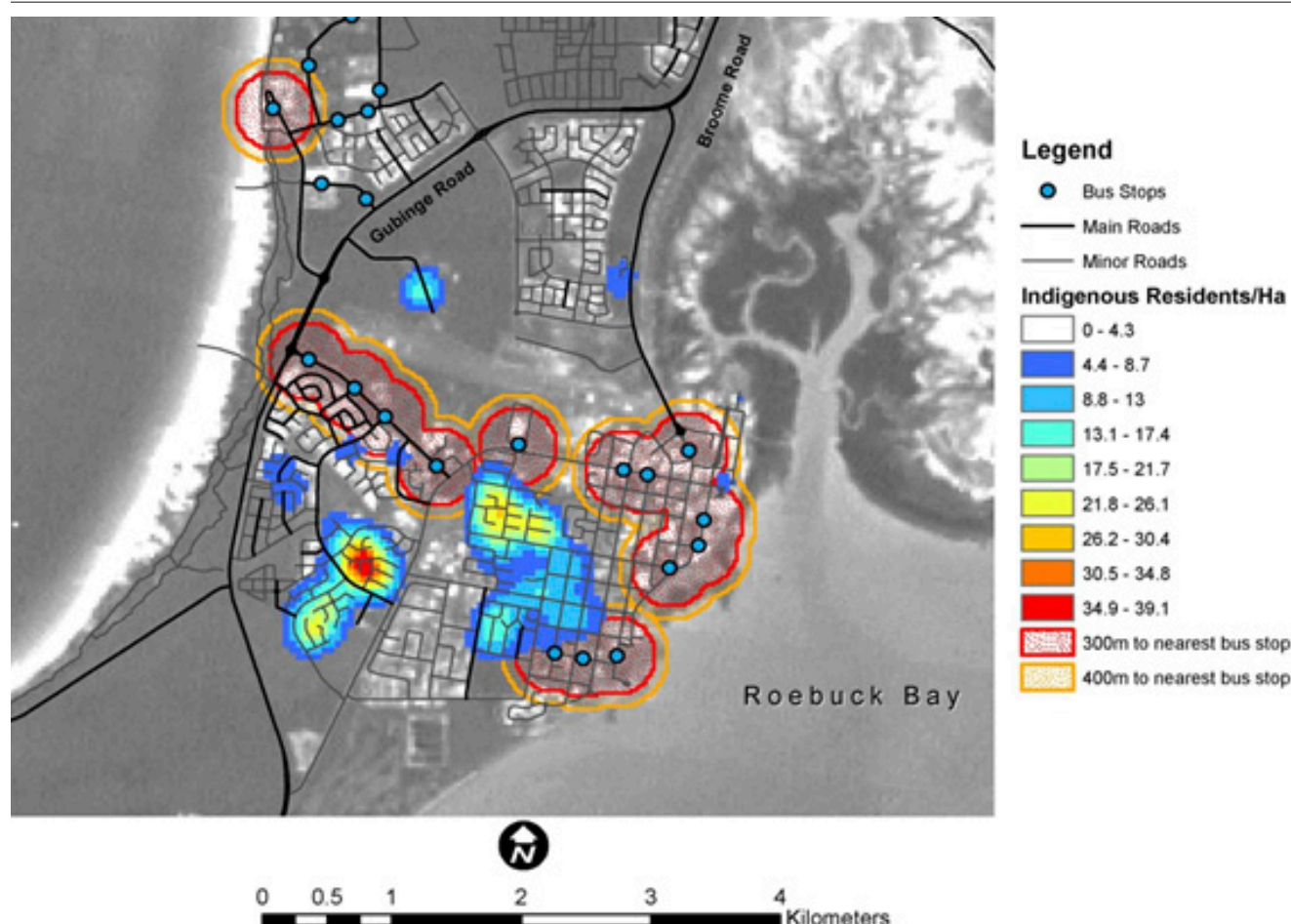
## Access to public transport

Considerations of accessibility are often at the forefront of housing and planning challenges in areas that are characterised by rapid development and its associated population growth. Given the demographic and infrastructure changes currently taking place in Broome and the pressure this creates for substantial expansion of the urban area and further dispersal of amenities, an increasingly urgent issue is emerging with regard to the access that Indigenous residents have to cheap public transport as opposed to the more expensive option of hiring taxis (which is common), or the more taxing option of walking everywhere to satisfy basic needs such as shopping, visits to the doctor, and attending school etc. (which is also common). The 2006 Census reported that 21 per cent of Indigenous households in Broome had no vehicle, compared to just 3 per cent of non-Indigenous households. In order to determine the implications of this lack of available personal transportation, the NBY GIS can be used to determine the exact level of physical proximity of Indigenous households to the Broome Town Bus service and suggest ways in which this might be maximised.

By introducing the location of each bus stop in Broome as a GIS layer, the straight-line distance to the nearest bus stop for each Indigenous household is easily calculated. This initial component is regarded as a fundamental part of accessing the broader public transport network (Liu & Zhu 2004). The distance between homes and the nearest bus stop can also be categorized according to the following walking distance buffers that have been established by Yigitcanlar et al. (2006: 10), who investigated public transport accessibility on the Gold Coast in Queensland:

- high access (a walking distance of less than 300 metres to the nearest bus stop)
- medium access (a walking distance of between 300 and 400 metres to the nearest bus stop)
- low access (a walking distance of between 400 and 800 metres to the nearest bus stop)
- poor access (a walking distance of greater than 800 metres to the nearest bus stop)

**FIG. 20.** Distance buffers for high and medium walking access to public bus stops in relation to Indigenous dwellings, Broome 2011



Source: YKC survey and Broome Town Bus Service.

**TABLE 4.** Indigenous dwellings and residents with high and medium access to public transport, Broome, 2011

| Level of access to public bus stops | Number of dwellings | Percentage of dwellings | Number of residents | Percentage of residents |
|-------------------------------------|---------------------|-------------------------|---------------------|-------------------------|
| 0–300m (high)                       | 127                 | 13.7                    | 399                 | 11.5                    |
| 300–400m (medium)                   | 72                  | 7.7                     | 274                 | 7.9                     |
| Total within 400m                   | 199                 | 21.4                    | 673                 | 19.4                    |

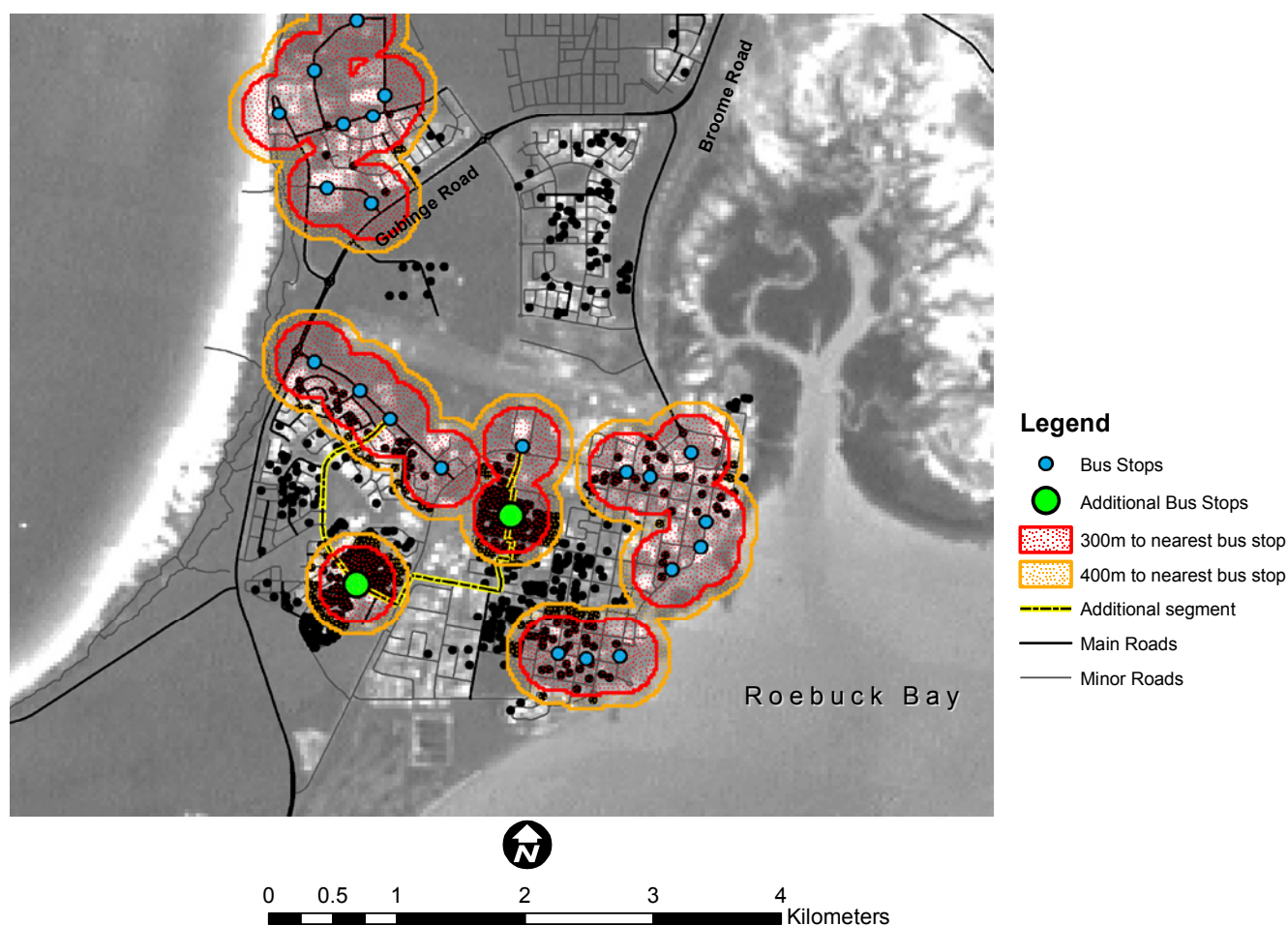
Source: NBY GIS.

The GIS can then generate boundaries for these categories in relation to Indigenous dwellings in Broome as shown in Figure 20 and the number and proportion of dwellings and people within each can be calculated. Given the relatively small spatial extent of Broome in comparison to the Gold Coast, this is done for the two narrower distance buffers in Table 4. It can be seen that only 14 per cent of Indigenous dwellings accounting for 11 per cent of Indigenous people have high levels of access to bus stops while medium access is available for only a further 7 per cent of dwellings and 8 per cent of the population. This means that 79 per cent of dwellings incorporating around 80 per cent of

the population have low or poor access to public transport. As a consequence, the vast majority of Indigenous people in Broome are likely to be disinclined to access this service, all other things being equal, and this may account for their distinct lack of utilisation of what, in normal urban environments, is a standard means of transportation and mobility for low income groups. To provide further context, Fig. 20 also shows these higher access buffers in relation to the underlying population density of Indigenous residents and this reveals emphatically that the two primary concentrations of Indigenous residents in Broome are mostly located outside the boundaries of the high to medium access.



**FIG. 21.** Distance buffers for high and medium walking access to public bus stops with the addition of a hypothetical route segment and two bus stops



Source: YKC survey and Broome Town Bus Service.

**TABLE 5.** Indigenous dwellings and residents with high and medium access to modified public transport route

| Level of access to bus stops | Number of dwellings | Percentage of dwellings | Number of residents | Percentage of residents |
|------------------------------|---------------------|-------------------------|---------------------|-------------------------|
| 0-300m (high)                | 383                 | 41.3                    | 1,492               | 43.0                    |
| 300-400m (medium)            | 132                 | 14.2                    | 489                 | 14.1                    |
| Total within 400m            | 515                 | 55.5                    | 1,981               | 57.1                    |

Source: NBY GIS.

This spatial mismatch between the distribution of Indigenous dwellings and a key urban service raises a number of fundamental questions about equitable access to facilities and it provides a highly practical case for considering whether an alternative bus route could be designed that provided for a more acceptable level of access for Indigenous residents. With its GIS capacity, NBY is now in a position to explore more optimal bus route configurations which. Obviously, these would be drawn into the areas of highest Indigenous population density and Figure 21 and Table 5 show the impact of the simple addition of a new route segment involving just two new bus stops, one on Reid Road and one near Anne Street.

This simple alteration to the bus route substantially raises the level of accessibility with high access rising from 13.7 per cent of dwellings and 11.5 per cent of the population to 41.3 per cent and 43.0 per cent respectively. With this configuration, more than half of Indigenous dwellings and people would be within 400m of a bus stop. Depending on the level of precision required, this sort of calculation could be enhanced by incorporating temporal aspects of public transport access and what services/town amenities Indigenous residents would like to connect to. Also of interest is whether a redesigned bus service could provide for Indigenous people living

beyond the town periphery in areas such as 12 Mile, Morrell Park and Coconut Wells. The distance buffers presented here are based on a densely-populated city on the eastern seaboard. As such, the assumptions behind the walking distances adopted may not translate accurately to the Broome context. Once again, GIS techniques can be applied in combination with cognitive mapping to incorporate more behavioural elements of accessibility and determine locally-specific walking thresholds. This type of iteration in the process of GIS inquiry is typical of its use as a decision-support system and demonstrates the new capacity for Yawuru to actively engage in community planning.

## Conclusion

In the first instance, the YKC survey was deemed necessary because of a perception that official census data had in the past significantly under-represented the Indigenous population of Broome. This problem now seems resolved, as the YKC count of usual residents is more or less in line with a synthetic estimate of numbers built from ABS calculations of likely omissions from the wider regional count in 2006. There is also now more confidence in the identification of Indigenous dwellings in Broome, with a dwelling list that is substantially higher than in previous official counts and locally verified as fully comprehensive. A further constraint was the incapacity of official data to represent the cultural diversity of the Indigenous population that lives on or visits Yawuru country. Yawuru decision-makers did not know the numbers of Yawuru people or of other cultural groups in Broome, but it is increasingly clear in a post-native title determination era that some mechanism for quantifying such groupings is necessary. The YKC now provides a practical example of how this can be achieved.

An important innovation arising from the survey has been the ability to geocode all survey information within a GIS. The products and services that are generated by spatially enabled government departments are increasingly being viewed as common goods available to citizens and businesses. This has led to a shift in focus from data production and delivery to applications as products and/or services (Thomas et al. 2009) and it has enabled the emergence of a wide range of social and community planning applications (Hugo 2001). In this instance, the NBY experience demonstrates how a product like the G-NAF can be linked to a detailed Indigenous household survey to provide distinct local perspectives on issues of concern. So far, this has focused on population and dwelling information, but the recent cultural management plan developed by NBY for Yawuru coastal country lists a number of key threats and pressures in Broome that also have distinct spatial elements, including growth in tourism activities, increased fishing effort, and increased

resource exploration and development (Yawuru Registered Native Title Body Corporate 2012: 142). With the NBY GIS framework and approach now in place, future surveys within Yawuru country, whether social, economic, cultural or environmental in focus, can add their outputs to an interactive spatial reference library for the Broome region in order to further enhance decision support.

Yawuru leaders are acutely aware of the importance and power of having such a tool relating to their own people and in their own hands. The practical and symbolic importance of this in regard to the YKC survey can be outlined as follows:

- It provides Yawuru with an informed basis for decision-making.
- It assists a dialogue between different native title groups in the Broome and West Kimberley regions who will be affected by the Browse liquified natural gas development, with the aim of building a concerted Aboriginal approach to managing the impacts of industrial development.
- It provides a baseline to measure impacts of economic and social change on Aboriginal society.
- It provides a basis for informed dialogue with Aboriginal interests, government and industry.
- It provides a basis of accountability for public policy and investment for Aboriginal development in the region (Yu 2011: 7).

This development in Broome begins to raise interesting questions about the proper role of public agencies such as the ABS and others who gather statistics on Indigenous populations in a post-native title determination context. Whereas in the past, governments have been content to generate a social category known as the 'Indigenous population' as an essential input to public policy, the legal and moral framework for this singular attribution has been—and is—shifting, such that individual groupings of Indigenous peoples are reasserting identity through legal means and acquiring rights with responsibilities to operate as significant institutional players at the local level. While a demography of 'Indigenous population' may be well suited to the broad provision of citizen rights, what it does not provide for is the expression of Indigenous interests in inherent and proprietary rights manifest in the many forms of native title settlement and agreement-making of various forms that increasingly exist for incorporated land-holding groups. Whilst not denying a continuing and proper role for centralised data collection, what these new institutional players are likely to seek from those agencies that have skills in data collection and management is a mechanism to enable capacity-building for the local compilation and use of data as a means of promoting full and effective participation in governance and development planning.



# Notes

1. Yawuru use the term 'Global Agreement' to describe the Yawuru Native Title Agreement, rather than a settlement which it clearly is not, nor a 'comprehensive agreement'. Yawuru avoid using the term 'comprehensive agreement' so as not to compare the Yawuru Agreement with Canadian comprehensive agreements between the Canadian nation state and First Nations and Inuit peoples, which have the support of constitutional recognition, legislation and established public policy in Canada. Yawuru consider that the concept of 'Global Agreement' is an accurate way to describe the Yawuru Agreement as a strategic leverage to protect Yawuru rights and interests and a basis for social and economic development. The word global is intended to describe the wide reach of matters contained in the Yawuru Agreement, although far short of a comprehensive set of matters which Yawuru would have asked to negotiate, had there been a formal policy of agreement-making between governments and native title holders in Australia.

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