



Atlas of Health-Related Infrastructure

in discrete Indigenous communities

Ross Bailie, Frank Siciliano, Geoff Dane,
Lee Bevan, Yin Paradies, Bronwyn Carson

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Ross Bailie

*Cooperative Research Centre for Aboriginal and Tropical Health,
Menzies School of Health Research and
Flinders University Northern Territory Clinical School*

Frank Siciliano

Cooyah Pty Ltd

Geoff Dane

Aboriginal and Torres Strait Islander Commission

Lee Bevan

Aboriginal and Torres Strait Islander Commission

Yin Paradies

*Cooperative Research Centre for Aboriginal and Tropical Health and
Menzies School of Health Research*

Bronwyn Carson

Menzies School of Health Research



Aboriginal and Torres Strait
Islander Commission



Menzies School of
Health Research



Cooperative Research
Centre for Aboriginal
and Tropical Health



Cooperative Research
Centres Australia

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Disclaimer

The maps included in this atlas are based on data as reported in the Community Housing and Infrastructure Needs Survey (CHINS) 1999. Care has been taken in ensuring the validity of the data. There are nevertheless a number of questionable values in the data that we have been unable to confirm. Such values relate to individual communities, and do not substantially limit achievement of the main aim of the atlas.

Acknowledgements

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INTRODUCTION



This atlas provides an overview of health-related infrastructure in discrete Indigenous communities across Australia. The broad geographic patterns of the different categories of infrastructure described in this atlas reflect policies and priorities of governments, at various levels, and other stakeholders over many years. There are many people with local knowledge and experience who will be better able to explain these patterns than the authors of this atlas; we have generally avoided explanations. Our aim, rather, is to describe the current status of health-related infrastructure to identify areas of relative need and to inform future policy development.

We have also briefly described the health significance of various categories of infrastructure. While the relationship between components of infrastructure and health appears self-evident in many cases, these relationships have often not been subject to sound modern research techniques, and the magnitude and the specificity of such relationships are not well understood.

The source of the data for the atlas is the Aboriginal and Torres

Strait Islander Commission's (ATSIC) 1999 Community Housing and Infrastructure Needs Survey (CHINS). The aim of the survey was to assess the current status of community- and housing-related infrastructure for discrete Indigenous communities in order to inform planning future development in those communities.* ATSIC engaged the Australian Bureau of Statistics (ABS) to conduct the survey.

While it is referred to as a survey, the CHINS attempted to gather data on all Indigenous housing organisations and discrete



DAVID WINSTANLEY

Indigenous communities across Australia. For the purposes of the survey, a discrete Indigenous community was defined as 'a geographic location, bounded by physical or cadastral (legal) boundaries, and inhabited or intended to be inhabit-

* ABS, *Housing and Infrastructure in Aboriginal and Torres Strait Islander Communities, Australia, 1999*, ABS catalogue no. 4710.0, Canberra



ed predominantly by Indigenous people, with housing or infrastructure that is either owned or managed on a community basis.* It was recognised that the application of this definition involved a degree of subjectivity, and in cases of doubt the location was *included* as a community. Locations were not included as communities if they had no usual population at the time of the survey, and were not expected to be reoccupied in the next 12 months. The survey included communities in urban and sparsely settled areas in all States and Territories.

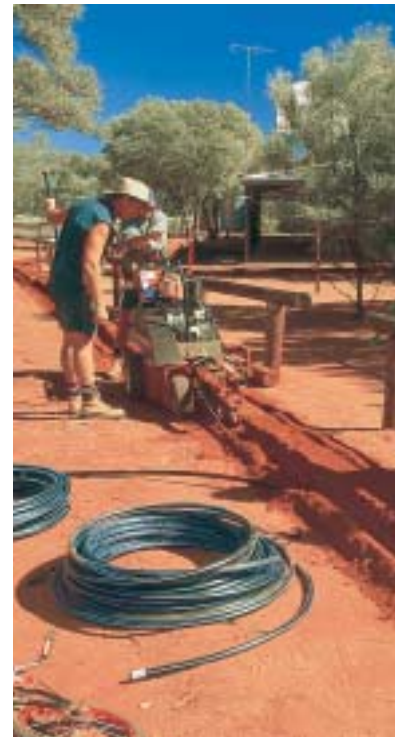
The information presented in the atlas does *not* reflect the status of infrastructure available to Indigenous people who do not live in discrete communities as defined above. Many Indigenous Australians do not live in such communities (see table 1 below) and the status of infrastructure available to these people should be the subject of attention in its own right.

In conducting the survey, the ABS compiled a comprehensive list of all discrete communities and substantial effort, reportedly, was

made to ensure complete coverage.

Data for the survey was collected through personal interviews with key members of communities who were knowledgeable about housing and infrastructure issues. Such people included community council chairpersons, administrators, coordinators, clerks, housing officers, and water and essential services officers. Information about health services was generally collected from health service administrators. Interviews were conducted by trained interviewers. Extensive testing and validation was undertaken to confirm the suitability of the methodology. Results from the validation indicated that aggregate data is fit for the purposes intended. However, for a number of communities some items were found to be associated with substantial reporting error. It was, therefore, advised that for the following items reliance should not be placed on the fine detail of geographic data: population, total dwellings owned or managed, condition of dwellings, and incidence of ponding.

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BARRY SKIPSEY

State/Territory	NSW	Vic	QLD	SA	WA	Tas	NT
Table 1 Indigenous population living in discrete communities by State and Territory							
<i>Percentage of communities in each State/Territory</i>	5%	<1%	12%	8%	22%	<1%	53%
<i>Total population living in discrete Indigenous communities†</i>	9 103	250	29 440	5 254	17 161	70	48 716
<i>Total projected Indigenous population‡</i>	116 652	23 801	113 111	23 405	59 382	16 106	54 587
<i>Estimated percentage of the total Indigenous population who live in discrete communities</i>	8%	1%	26%	22%	29%	<1%	89%

† Total population living in discrete Indigenous communities as recorded in the Community Housing and Infrastructure Needs Survey 1999

‡ Total projected Indigenous population — low series, 1999 (Australian Bureau of Statistics & Australian Institute of Health and Welfare 2001 901/id)

* *Community Housing and Infrastructure Needs Survey, Australia, 1999: Data Dictionary* (compiled by ABS, published by ATSI, 2000)

MAPPING

The maps of Australia are presented on the Australian Simple Conic projection. ATSIIC region boundaries and Regional Council names are current as of April 2001.

For any single map, communities with a reported population equal to 0, as well as those communities which recorded 'not stated', 'not applicable' or 'not collected' responses, have been excluded. In some cases, map data have been streamlined in an effort to highlight a point related to a particular variable. Readers requiring detailed information about data collected should request a copy of the *Community Housing and Infrastructure Needs Survey, Australia, 1999: Data Dictionary* from ATSIIC (details, p. 71).

Discrete communities included in the CHINS have been categorised based on their reported population. Four classes have been used: less than 50, 50 to 99, 100 to 199 and 200 to 3000. Communities are shown with four sizes of dots corresponding to each class and the maps show the bi-variate nature of data being presented (i.e. population size and the particular variable under discussion). The number in brackets after each population class refers to the number of communities in that specific class.

For more detail on mapping please refer to explanatory notes on page 70.



TOP TO BOTTOM: LEFT TO RIGHT: DAVID HANCOCK, GEOFF CAMP, RUSSELL GRUEN, RUSSELL GRUEN

Table 2 Number of discrete Indigenous communities by State and Territory, and community size

	Community size					Total number of communities
	Less than 20 people	20–49 people	50–99 people	100–199 people	200+ people	
New South Wales	2	7	18	19	21	67
Victoria				2		2
Queensland	73	23	4	5	35	140
South Australia	58	15	12	6	9	100
Western Australia	116	73	30	35	20	274
Tasmania			1			1
Northern Territory	327	181	37	30	64	639
Australia	576	299	102	97	149	1223

Specific items from the CHINS were included in this atlas on the basis of their significance to the health of the populations of specific communities. The general areas covered are:

- Housing
- Water supply
- Sewerage
- Waste
- Power
- Communications
- Roads and air access
- Educational facilities
- Health facilities and personnel

The distribution and relative size of the communities is reflected in map 1b. In general, communities are concentrated in the broad areas of northern and central Australia. Notable features of the communities in Northern Territory, Western Australia and to a lesser extent in South Australia are their small size and wide dispersal. The absence of communities in the interior of Queensland reflects the forced resettlement of Indigenous people following European settlement. Most of the communities in south-east Australia are based around former missions and reserves. Many of the larger communities in other parts of the country also have their origins in mission-based settlements.

The wide dispersal of the communities throughout the interior of Australia presents major challenges in the provision of new infrastructure and the maintenance of existing resources. These challenges are compounded by a significant history of underfunding which has created a backlog in Indigenous housing and infrastructure need. The cost of



UNKNOWN

addressing this backlog has been estimated at around \$2 billion for housing and \$500 million for other infrastructure (estimate used for recent internal ATSIC funding submission). Given the significance of infrastructure to the health of the people living in these communities, and the comparatively poor state of health of Indigenous people, especially those in rural and remote areas, it is essential that this challenge is effectively addressed.

The generally impoverished condition of the household and living environment of many Indigenous people may impact on health and quality of life in a variety of ways. Specific hazards within the environment as well as the general effects of deprivation may impact on the physical and mental health of individuals. The environment also impacts on social processes and thereby on the health of groups of people. Relative disadvantage is recognised as a source of stress, with flow-on effects to health. Relatively disadvantaged members of societies suffer higher burdens of both infectious and non-infectious disease and injury.

The overview of health-related



RUSSELL GRUEN

infrastructure provided by this atlas should assist funding agencies, policy-makers and planners in identifying broad geographic and infrastructure priority areas for intervention. This overview also provides those communities that participated in the 1999 CHINS with a picture of how the situation in their community relates to, and contributes to, the broader national situation. A more detailed examination of the information arising from the CHINS will be useful for the fine detail of decision-making for resource allocation, policy-making and planning.



NITDIPE



DAVID HANCOCK

Map 1a

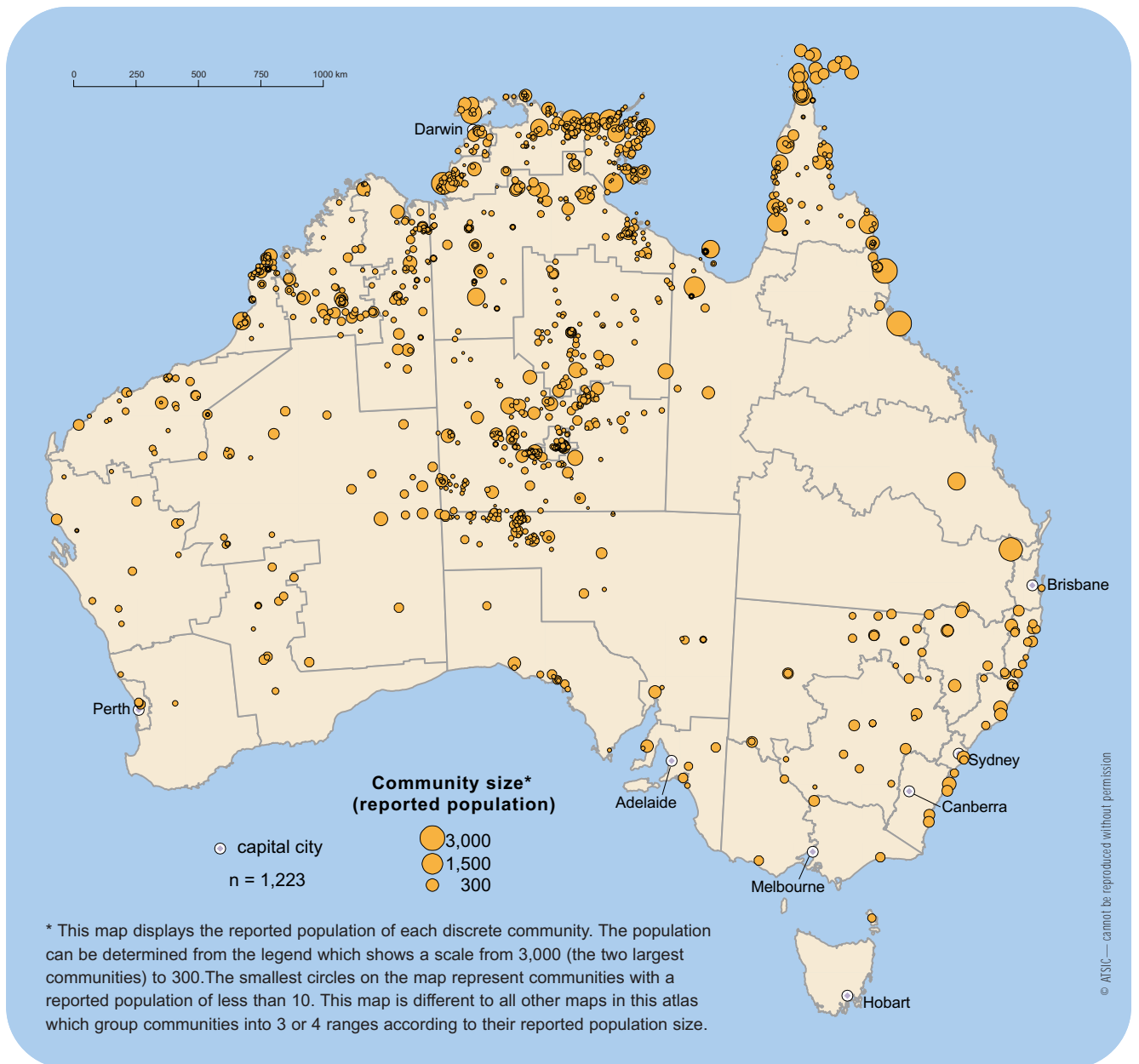
ATSIC regions



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Discrete Indigenous communities by population size

Map 1b



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HOUSING

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ousing may have a variety of effects on health, through a range of mechanisms. These effects may result in specific diseases such as gastroenteritis and asthma, or may have a general impact on physical and mental health. Health effects may be mediated by the physical aspects of housing, such as design, function, level of crowding and cleanliness. Socio-cultural factors and the resourcefulness of individuals can also influence the relationship between housing and health. Kinship responsibilities, socioeconomic status, understanding of disease processes, the ability to repair breakdowns of infrastructure, and level of isolation can all be contributing issues. The interaction between physical and social factors produces a complex relationship between housing and health. There is substantial evidence to support the relationship between housing and infectious disease. The relationship between housing and chronic disease and mental health is less well understood.

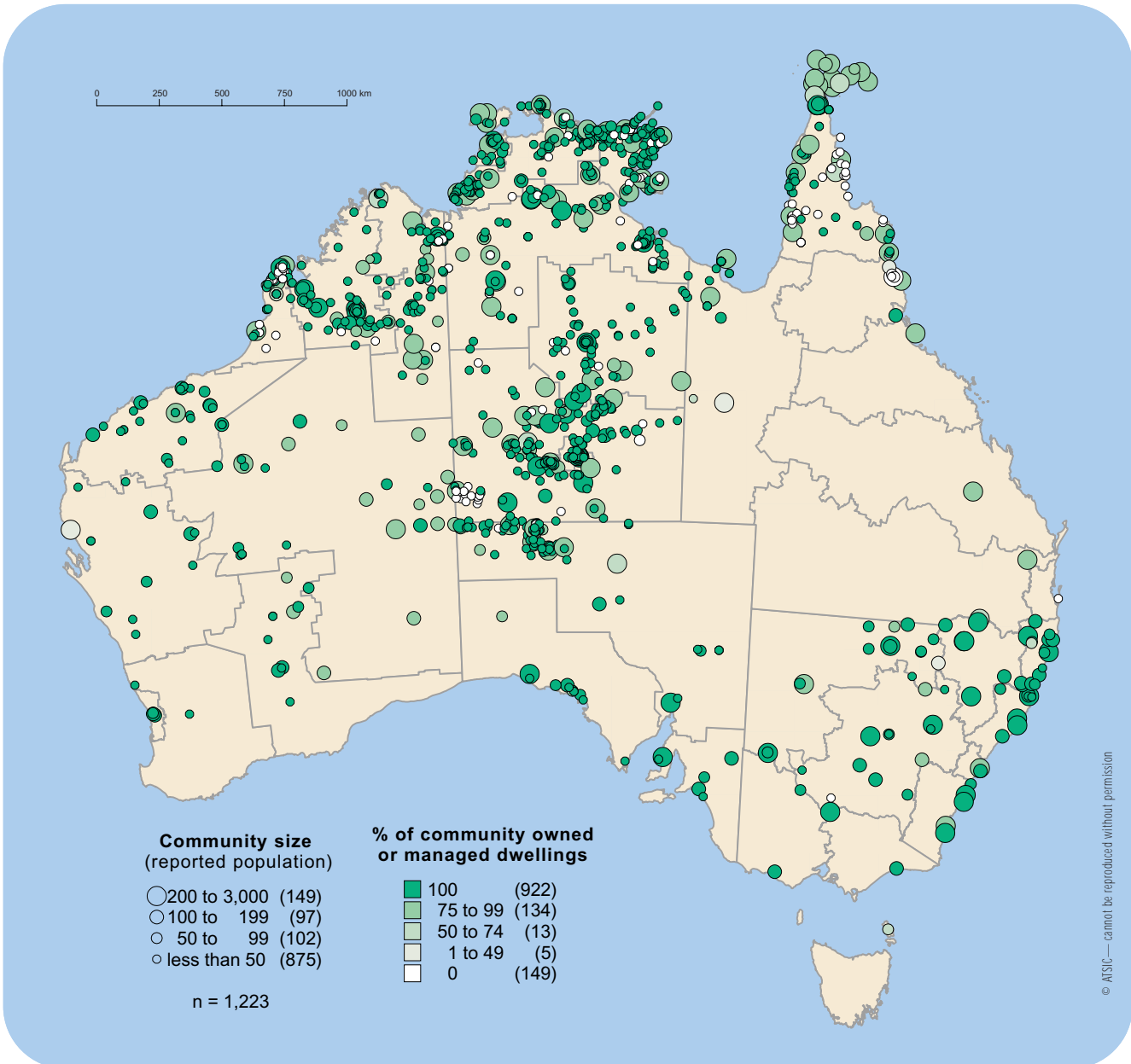


CLOCKWISE FROM TOP LEFT: NTDIPE, GEOFF CAMP, NIC GAMBOLD, RUSSELL GRUEN

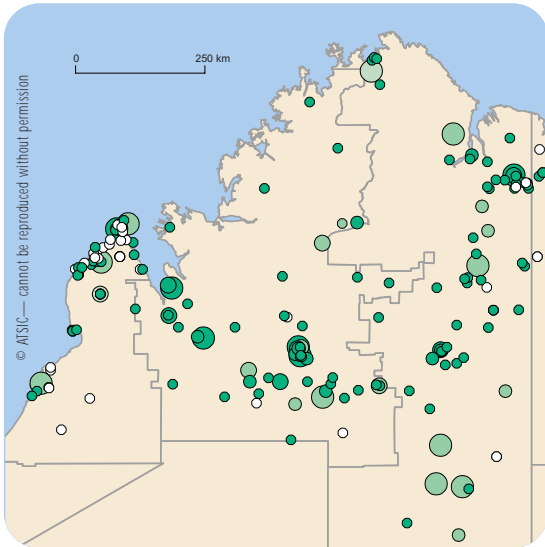
Map 2

Community-owned dwellings

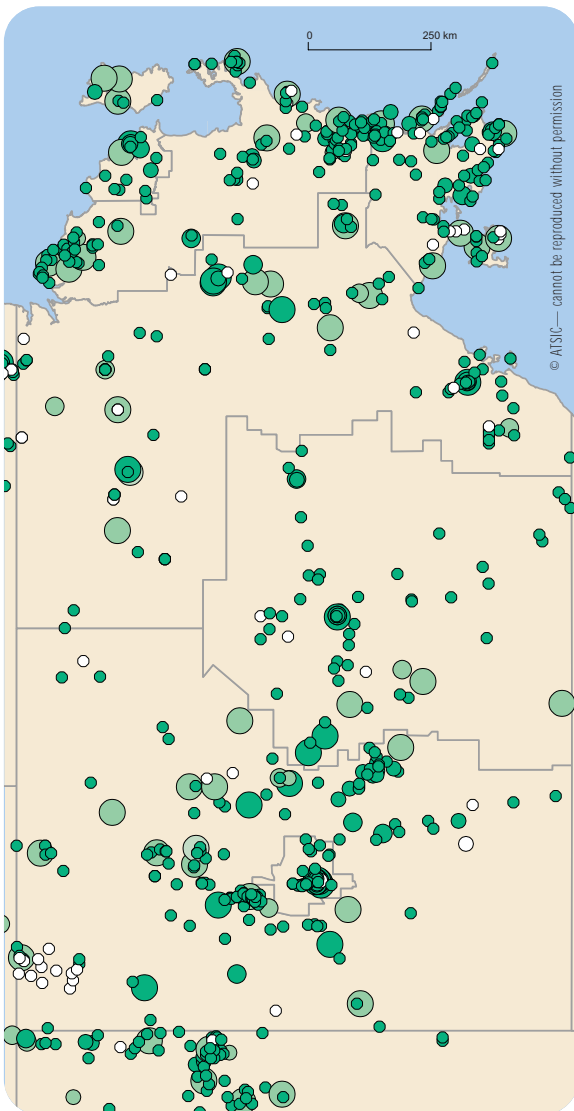
By definition the communities included in the CHINS should consist predominantly of houses that are owned or managed on a community basis. However, map 2 shows that in some areas, notably New South Wales, even some of the larger communities have only a small number of community-owned dwellings.



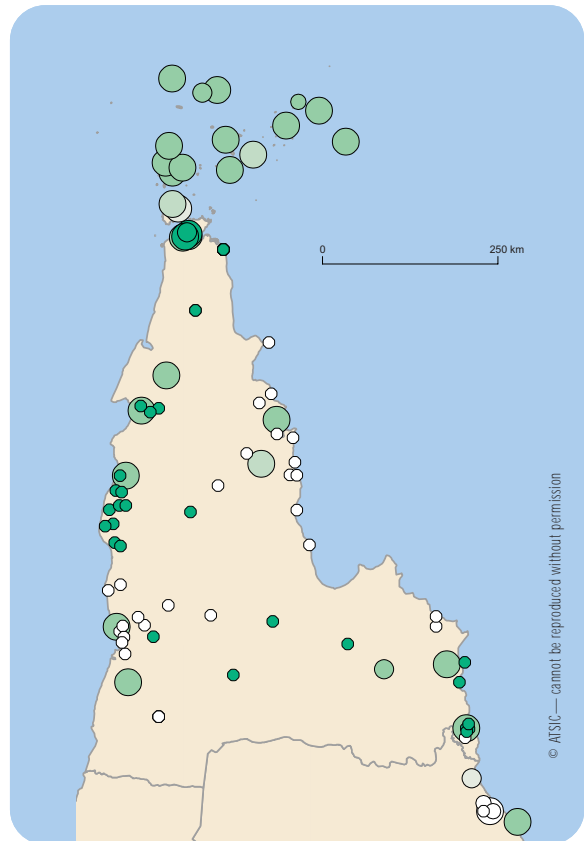
The Kimberley



Northern Territory



Cape York Peninsula



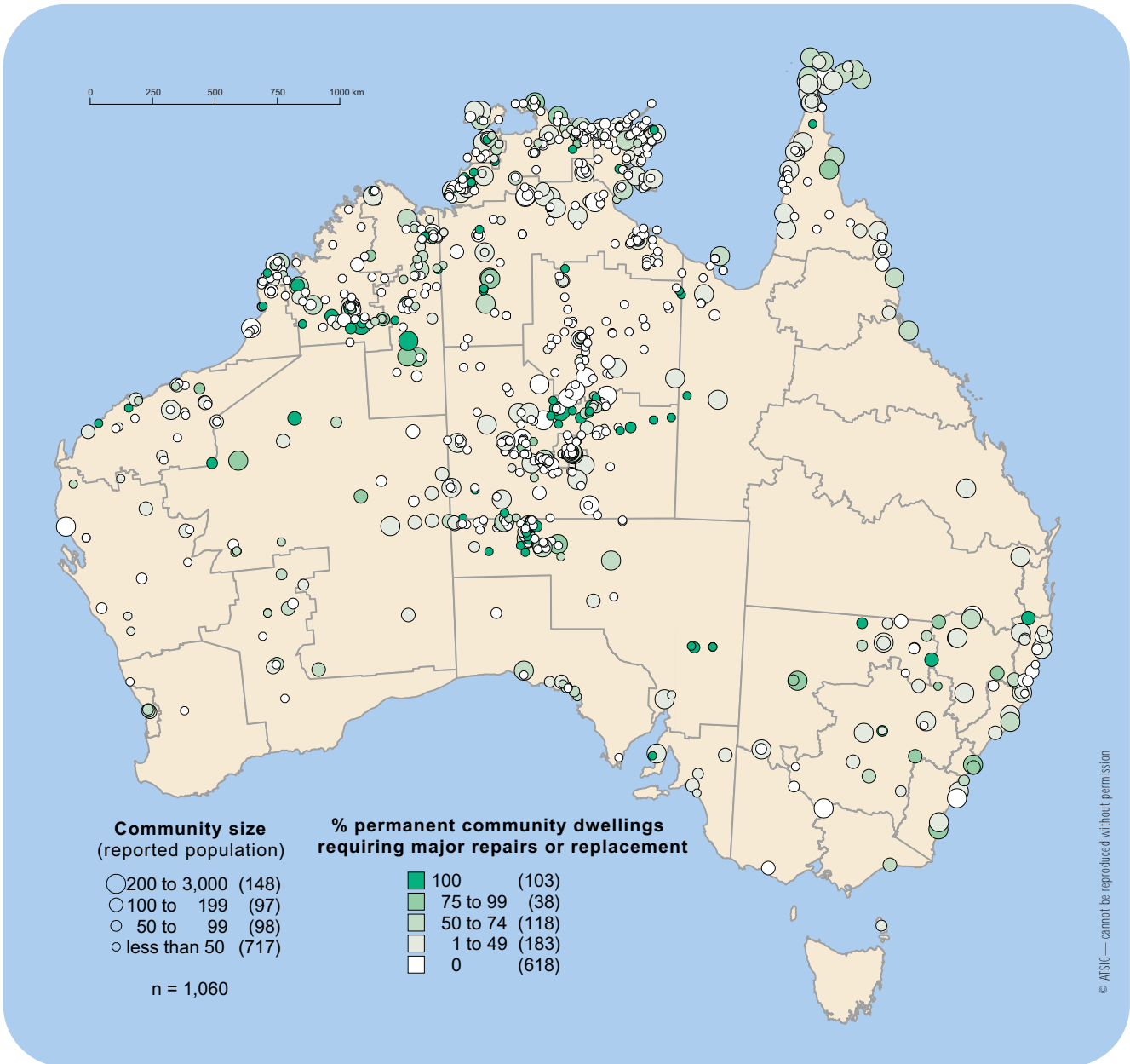
Map 3

Percentage of community-owned or managed permanent dwellings requiring major repairs or replacement

Map 3 shows the percentage of permanent dwellings in each community that required major repairs. Larger communities with a high percentage of affected houses are of greater concern in terms of the number of people affected, and there appear to be more communities of this type in New South Wales, the Kimberley, the Top End of the Northern Territory, the Torres Strait and Cape York Peninsula. There are also a significant number of smaller

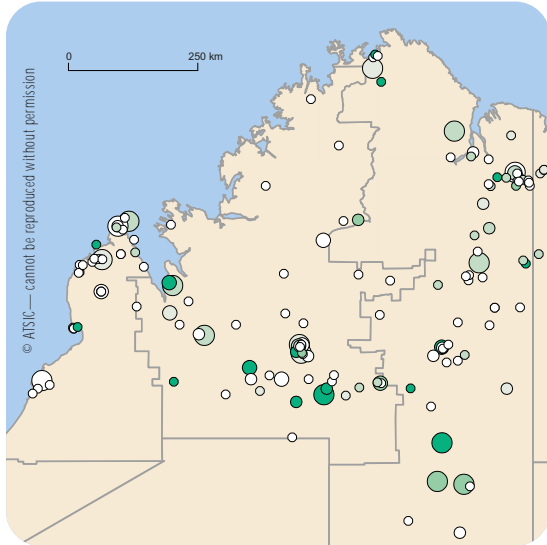
communities with a high percentage of houses requiring major repairs scattered through Central Australia and the Top End, the Kimberley, and in New South Wales.

Those communities that reported a high percentage of permanent dwellings requiring replacement (as opposed to major repairs *or* replacement) tended to be smaller in population size and concentrated around Central Australia and the Kimberley region.



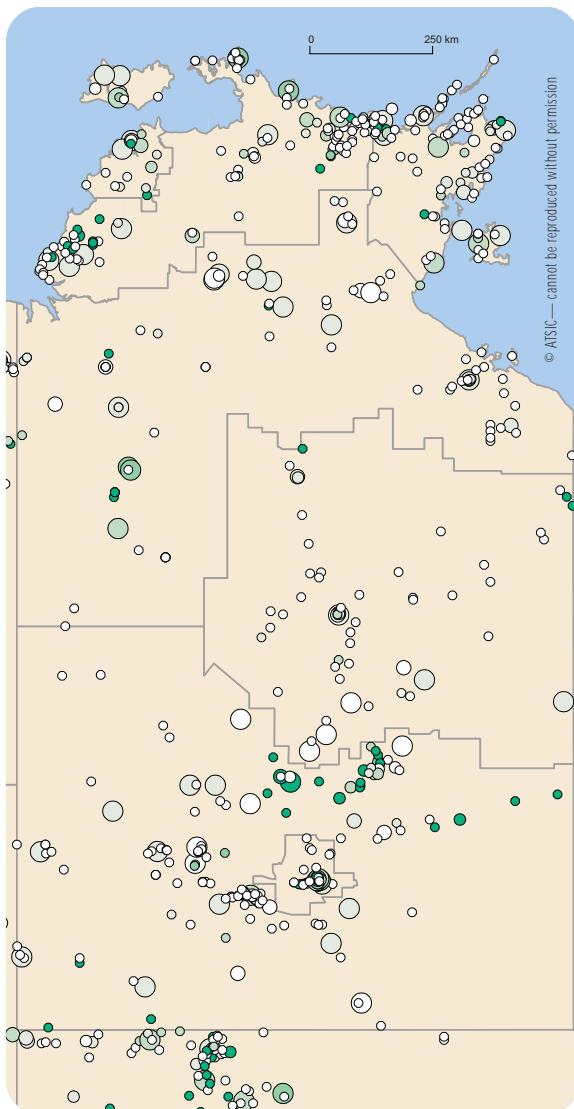
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The Kimberley

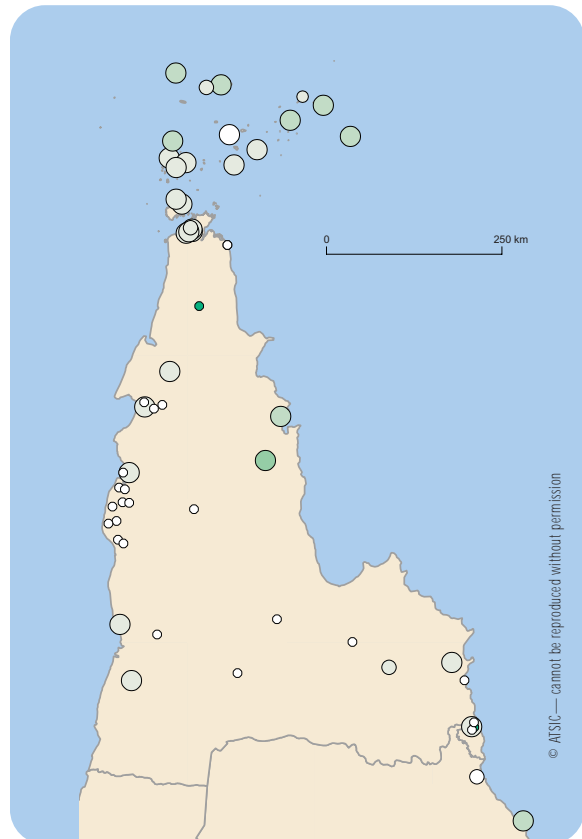


Twenty-one per cent of community dwellings across Australia required major repair. A further 9% required replacement.

Northern Territory



Cape York Peninsula



Map 4

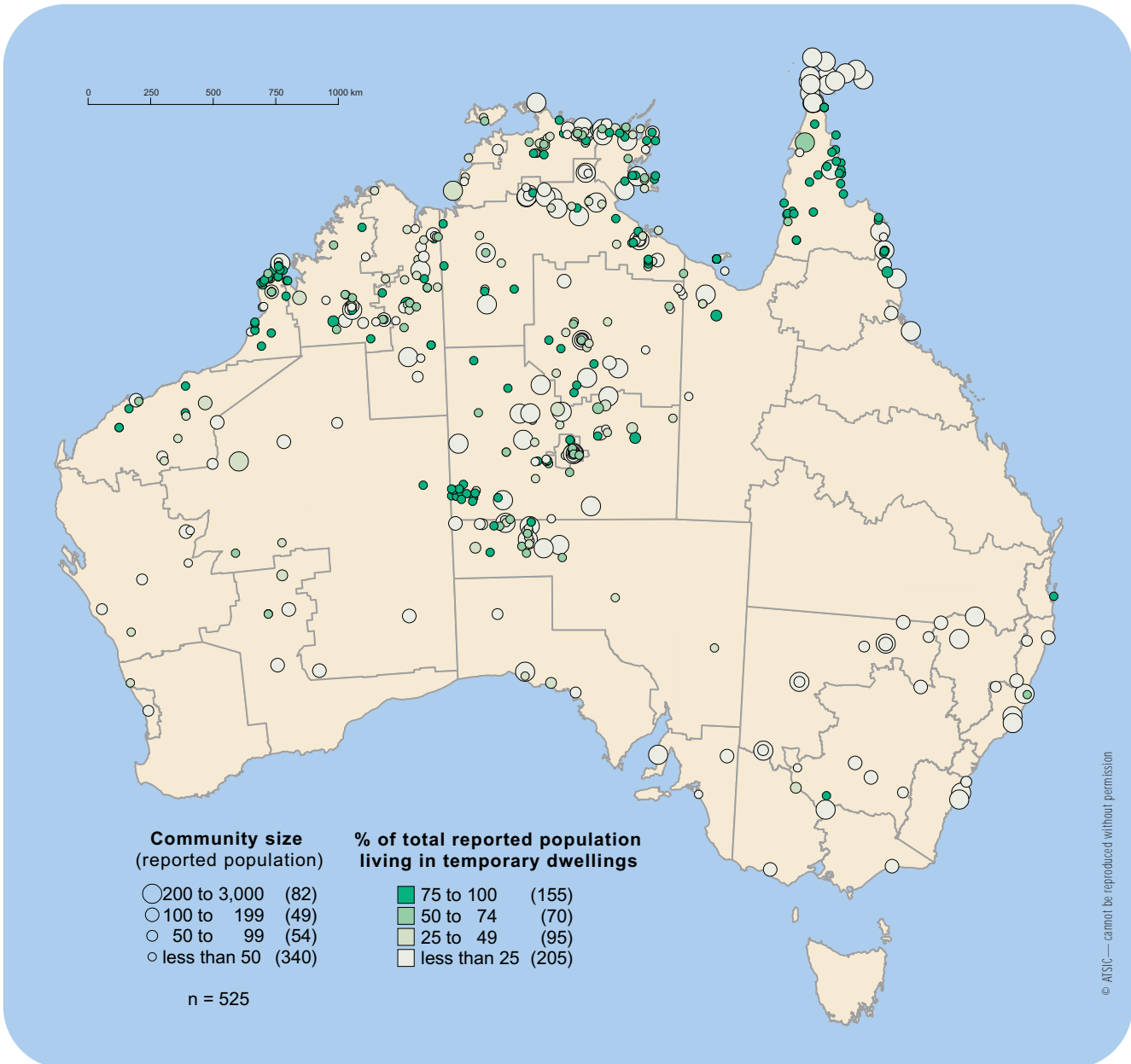
Percentage of community population living in temporary dwellings

It is estimated that about 13% of Indigenous people living in remote communities live in temporary dwellings, including tin sheds, caravans or 'humpies'. Temporary dwellings are likely to be less conducive to health for a variety of reasons, including: structural safety; resistance to weather conditions; space constraints; lack of reticulated water and safe power supply; lack of internal structural features for food preparation, washing, disposal of waste, storage of

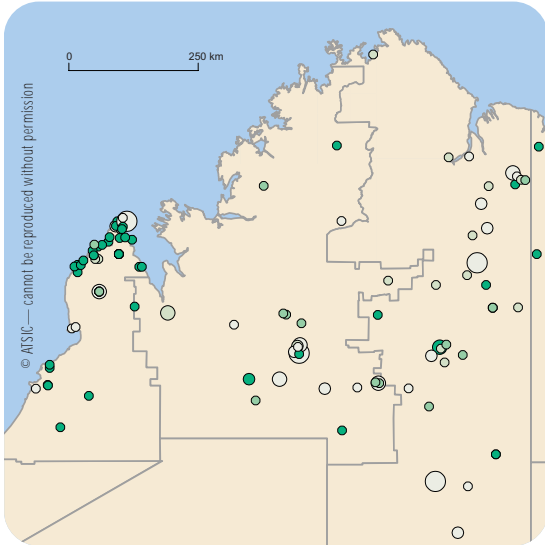
food and other household items; and a number of other features.

Map 4 shows the percentage of the reported population of communities who live in temporary dwellings. The highest percentages tend to be in *smaller* communities in Northern and Central Australia, with clusters of such communities in the south-western and north-eastern corners of the Northern Territory, on the Kimberley coast and on Cape York Peninsula.

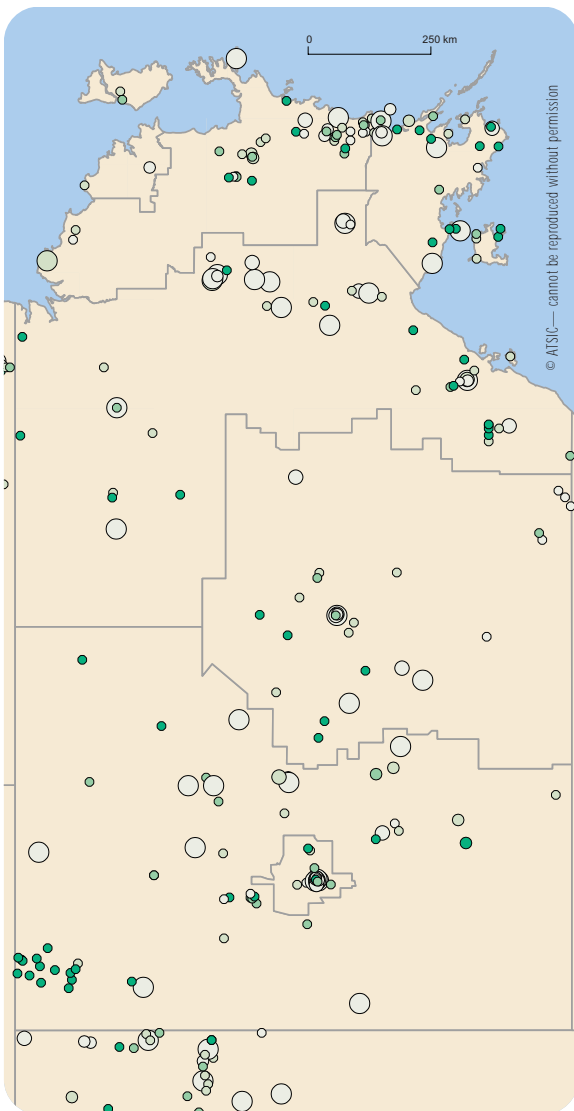
However, there are larger numbers of people living in temporary dwellings within *larger* communities. The larger communities most affected appear to be in Central Australia with others scattered across Northern Australia (not shown here).



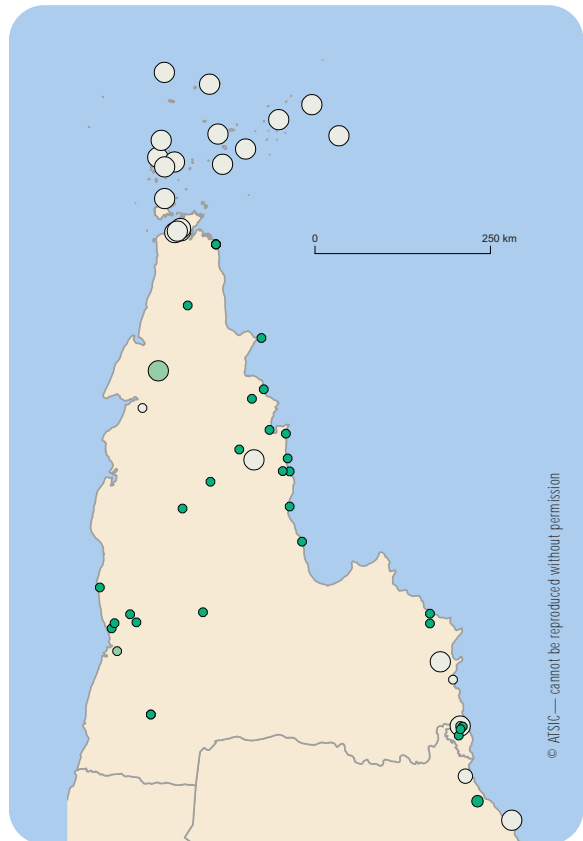
The Kimberley



Northern Territory



Cape York Peninsula



WATER SUPPLY

an adequate and safe water supply is essential for health. Inadequate water for drinking and for food preparation

may compromise health through dehydration, inappropriate intake of alternative liquids (e.g. high-sugar-content soft drinks, alcohol) and contamination of food with microorganisms or toxins. An adequate and safe water supply is also essential to household hygiene — bathing or showering, washing clothes and cleaning household surfaces, particularly those used for food preparation. Inadequate water for household hygiene predisposes residents to a variety of gastro-intestinal and respiratory infections.

Water is also necessary for cultivation of grass and other vegetation to suppress dust around houses, and for the cultivation of fruit and vegetables. Dust is believed to be a factor in respiratory and eye infections. Local cultivation of fruit and vegetables

may help address the problem of poor availability, high cost and poor quality of these foods in many remote communities — an important

factor in nutrition and health in such communities.

Water supplies contaminated with microorganisms, chemicals, trace elements or radioactive material may cause a variety of health effects. Such contamination may be present at the source of the supply or may be the result of human activity such as mining, agriculture, and the inappropriate disposal of wastes. Inadequate infrastructure may also allow contamination in the supply process.

The water source type is not necessarily related to the quality or adequacy of the supply. The adequacy and safety of bore water, for example, is dependent on the volume and quality of the ground-water source and a secure reticulation system that is not vulnerable to contamination. Town-water supplies are generally monitored for quality and, while they may be subject to restrictions, the supply is adequate for basic living purposes under most conditions.



RUSSELL GRUEN



CLOCKWISE FROM TOP LEFT: DAVID HANCOCK, RUSSELL GRUEN, NIC GAMBOLD

Map 5

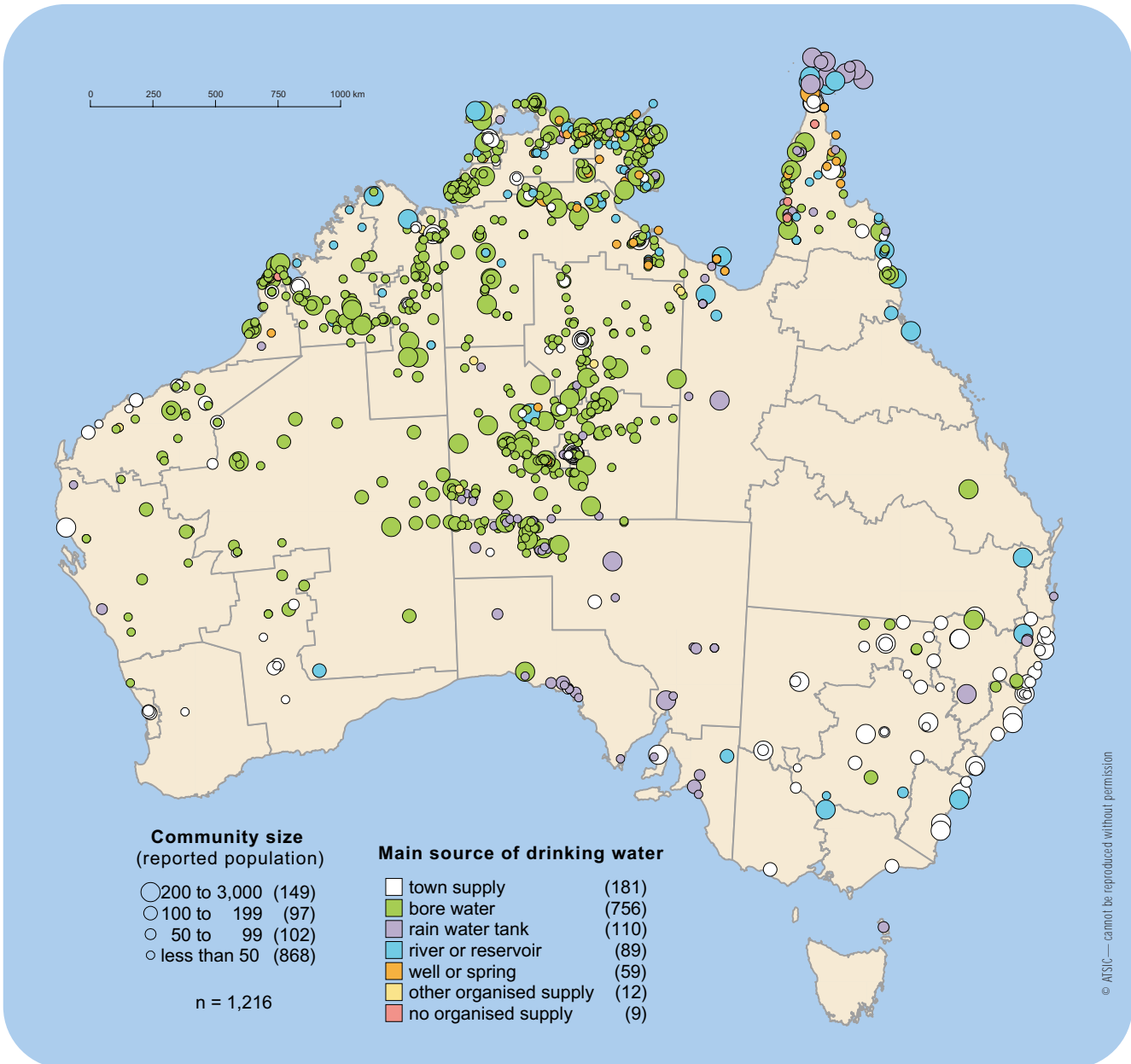
Main source of drinking water

Map 5 shows the distribution of the main drinking water source varies considerably across the country. The Kimberley, many communities in the interior of Western Australia, Central Australia, the Top End and the Cape York Peninsula are dependent on bore water. Most communities in New South Wales are connected to a town water supply, probably reflecting the general proximity of many communities in that state to towns or cities.

Many communities in the Torres

Strait and South Australia rely on rainwater tanks. Rainwater tanks may be the preferred or only drinking-water source in areas with no surface or underground supplies or where those supplies are either restricted in quantity (e.g. the Torres Strait) or of poor quality (e.g. South Australia). Rainwater tanks, if carefully monitored and maintained to prevent contamination, may provide adequate quality drinking water in sufficient quantities.

Two hundred and sixteen permanent dwellings across 94 communities were not connected to a reticulated water supply.

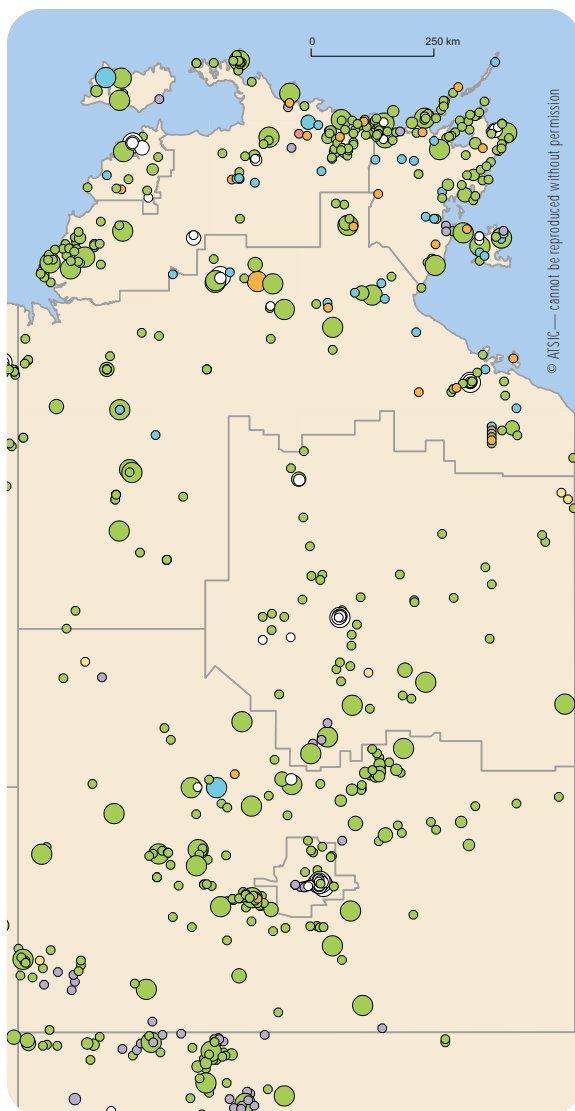


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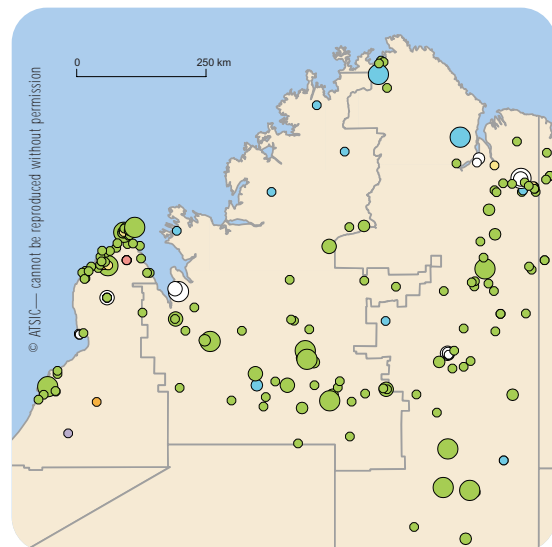
The majority of communities have water reticulated to all permanent dwellings (not shown here). However, there are a number of communities where this is not the case, and these communities tend to be in the Top End, the Kimberley, Cape York Peninsula and the Torres Strait. It should be noted that the numerous temporary dwellings in many communities are unlikely to have reticulated water.

In 1992, 56 communities indicated they relied on carted water while in 1999, one community reported carted water as its main supply. This improvement reflects the priority that infrastructure projects in Indigenous communities have placed on water supply over the past decade.

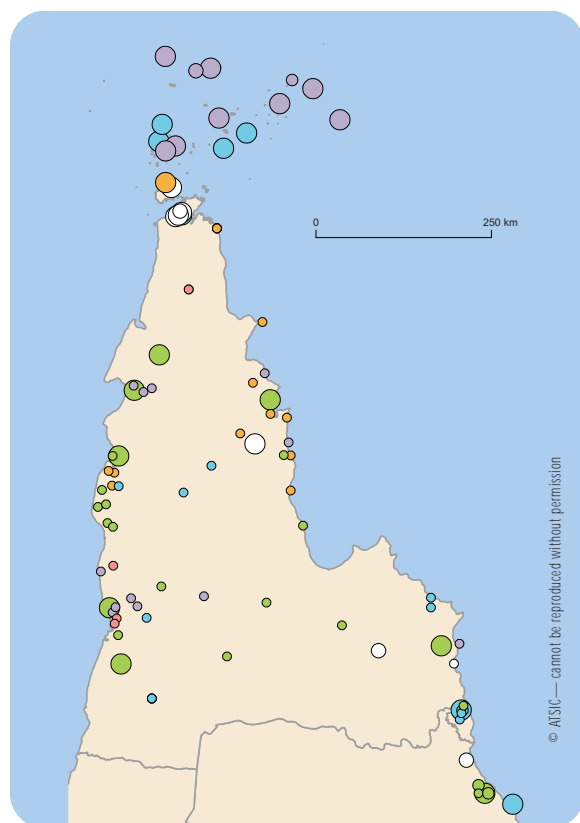
Northern Territory



The Kimberley



Cape York Peninsula



Map 6

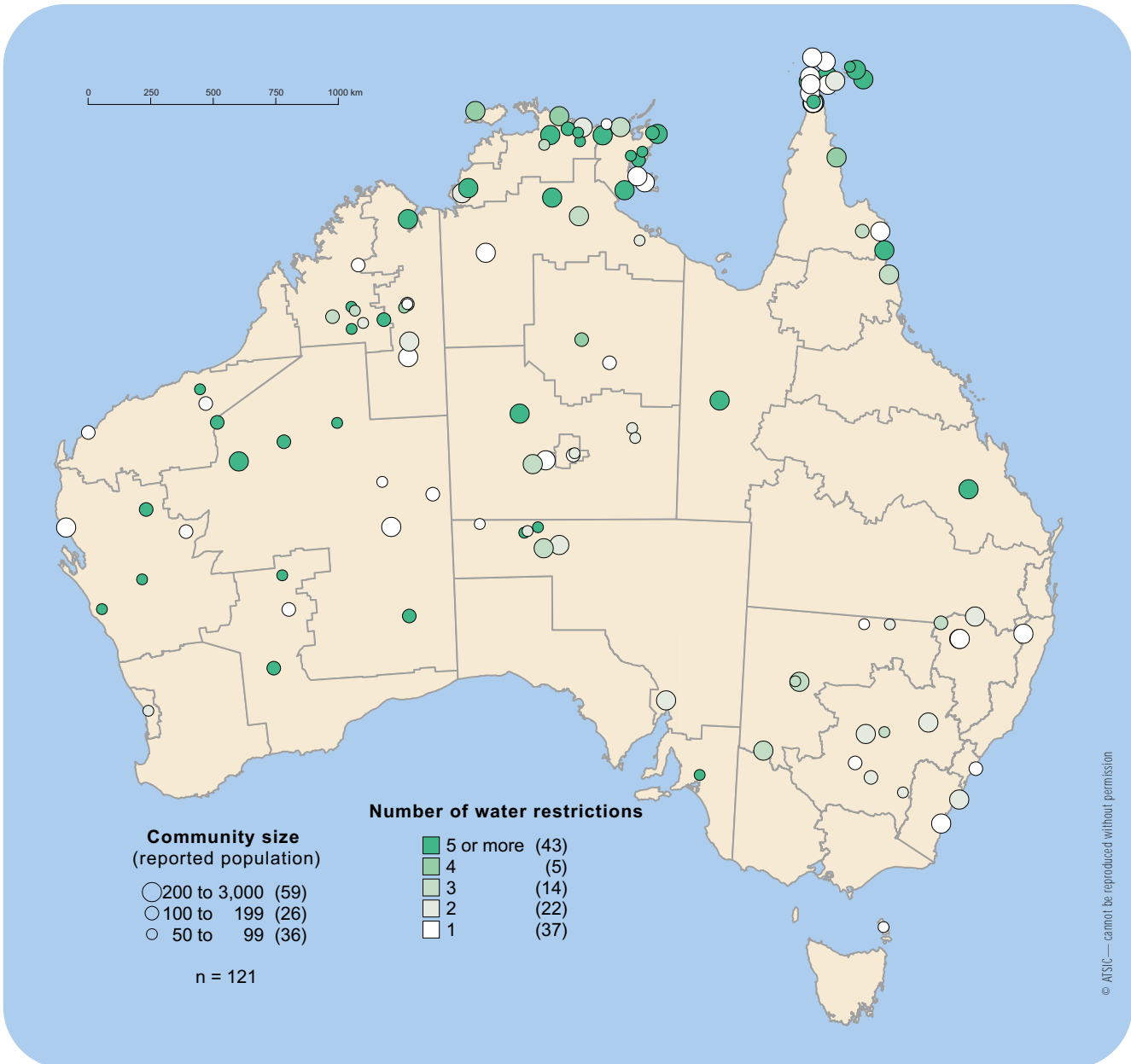
Number of water restrictions in the 12 months preceding the survey

Map 6 shows the frequency of water restrictions in communities of 50 people or more. This information was not collected for communities with a population of less than 50.

Communities in Central Australia appear less likely to be subject to water restrictions than in most other parts of the country. Many communities in the Torres Strait tended to be subject to water restrictions for longer periods than communities elsewhere. 'Equipment

breakdown' was a common reason for restrictions across the country. Another common reason given was 'normal dry season', notably in a number of larger communities in the Top End, the Torres Strait and Cape York Peninsula, and in New South Wales.

One hundred and twenty-one communities across Australia were affected by at least one episode of restricted water supply in the 12 months preceding the survey. Twenty-eight communities with populations of 100 or more were subject to water restrictions five or more times in this period.



Frequency of water-testing

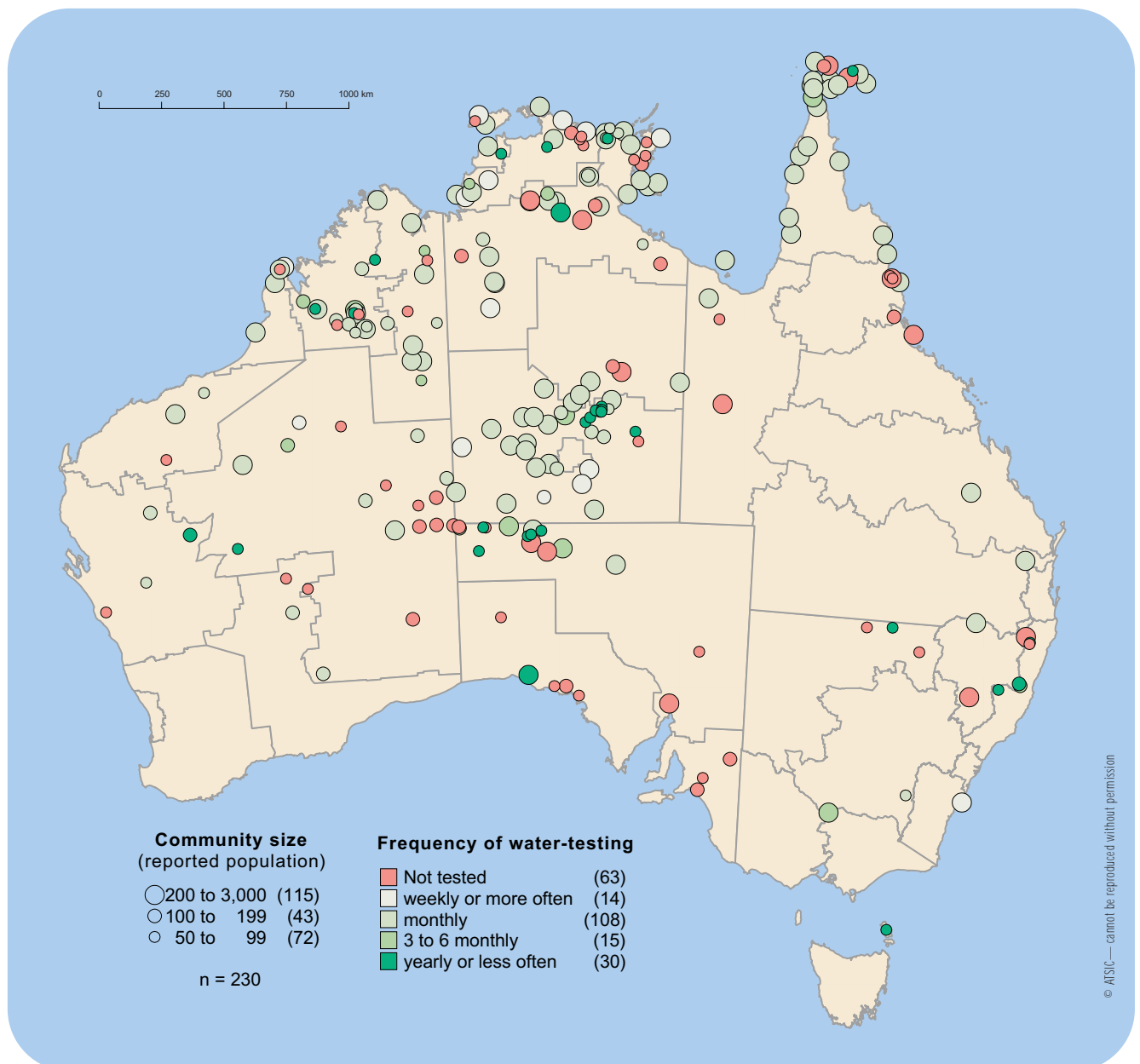
Map 7

Information on the frequency of water-testing was sought from communities with a population over 50 and without a town-water supply as their main source of water. (Of 230 communities, two did not state the frequency of water-testing.) The requirement for regular testing of water quality, the type of tests and the frequency with which testing should be done is dependent on local factors that influence the risk of contamination. As is shown in map 7,

the frequency of water-testing varies between communities. However, it is notable that a substantial proportion of communities reported no water testing, including a number of larger communities. These communities tend to be in the Top End, Central and South Australia, and the Torres Strait.

There are a number of significant challenges in conducting regular testing programs in remote communities, particularly in relation to microbiological testing. These

include the availability of trained staff to collect samples and the limited availability of transport to get samples to laboratories within the limited period of time required to ensure the validity of readings.



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FLOODING & PONDING

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looding was defined for the purposes of the CHINS as 'instances where watercourses overflow and inundate

either part or all sections of the community'. Flooding impacts on health through the immediate risk of drowning, disruption of essential services (and clinical and public health services), damage to health-related infrastructure such as water supply and sewerage systems, disruption of normal community life, loss of property and consequent psychological distress.

Ponding was defined for the purposes of the CHINS as 'pools of still water that remain stagnant for a period of one week or more and cover an area of at least 10 sq m'. To meet the definition, the pool of stagnant water had to be within the boundary of the community. Naturally occurring swamps or lagoons were not included in this definition.

Ponding provides breeding sites for mosquitoes, and is a major factor in the occurrence of mosquito-borne diseases such as Ross River Virus infection and Murray Valley Encephalitis.



NTD/PE



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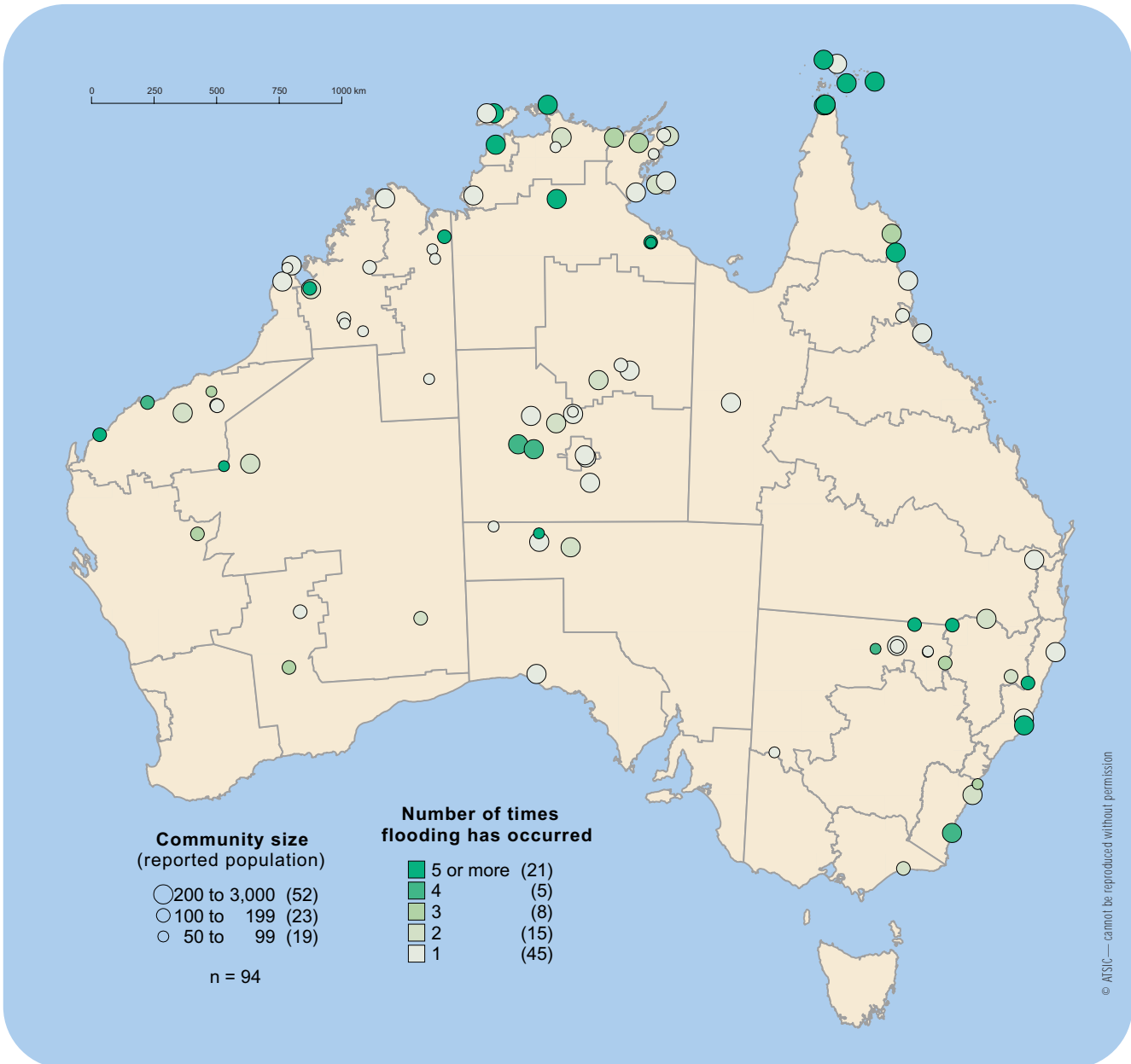
Map 8

Occurrence of flooding

Map 8 shows flooding to have occurred in 94 communities scattered across all of mainland Australia in the 12 months preceding the survey. Many large communities in Central Australia, northern New South Wales and the Top End were affected, and flooding was a common occurrence in Torres Strait communities.

Of the 21 communities that experienced 5 or more flood events in the year prior to the 1999 CHINS, six were located either in the Torres Strait or on Cape York Peninsula.

In all, 282 dwellings were affected by flood events.



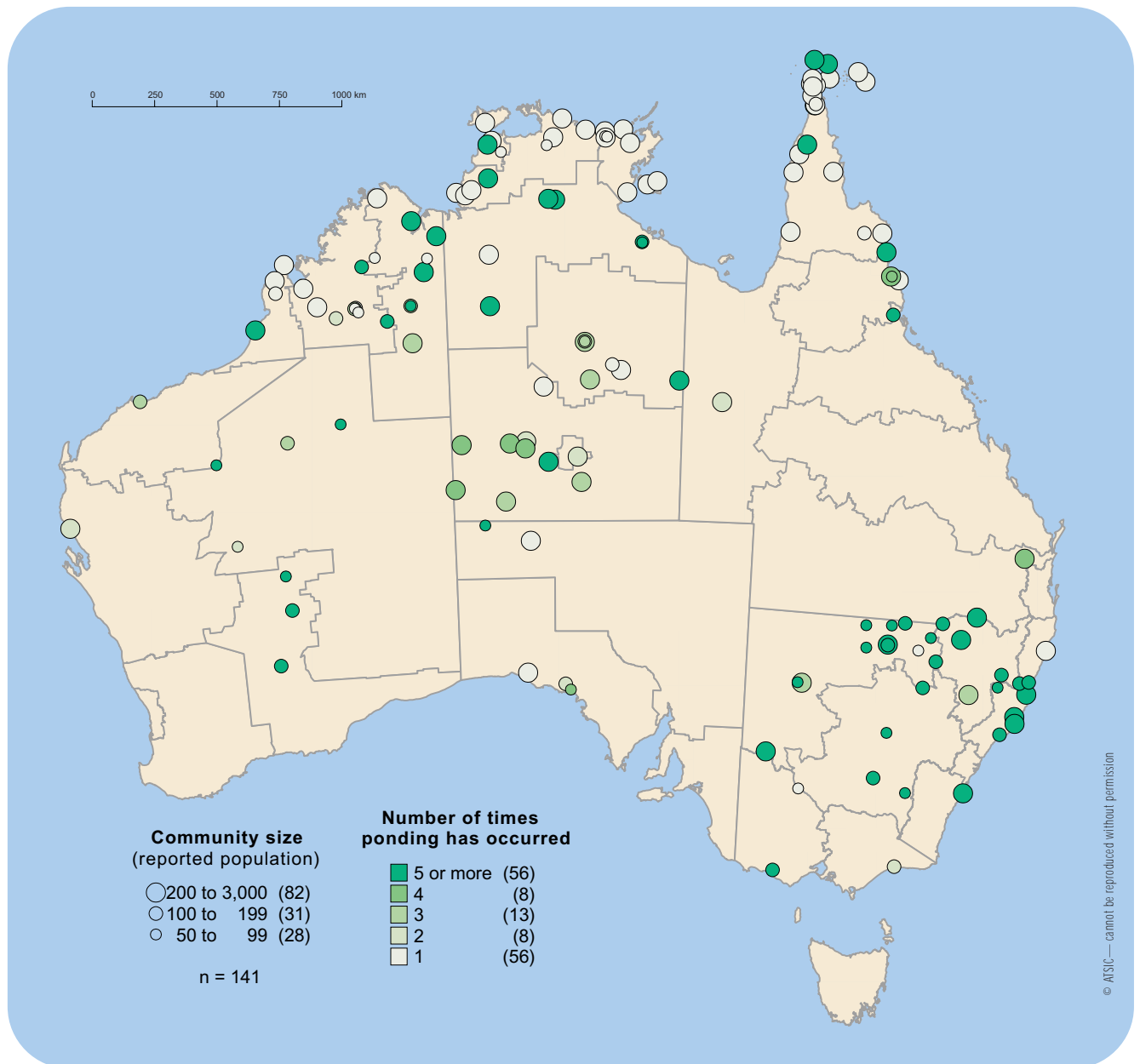
Occurrence of ponding

Map 9

Map 9 shows a large number of communities across the country to be affected by ponding. The high frequency of ponding in a large number of communities in New South Wales is notable. By far the most common reason for ponding in all regions was reported to be rain. Other reported reasons included overflowing or blocked drains (particularly in New South Wales and Cape York Peninsula), sewerage or water leakage (particularly in New

South Wales), and overflowing rivers.

Ponding as a result of sewerage leaks poses particular risks to health, and this issue is addressed in more detail in the Sewerage section on page 26.



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SEWERAGE

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he development of sewerage systems and the safe disposal of human waste are believed to be major

factors in the improvement of health in industrialised countries over the past two centuries. Community water-borne systems have become standard in towns and cities in industrialised countries. These systems involve flush toilets and conveyance of sewage in closed pipe systems via gravity and pumping stations to a common sewage treatment plant.

A variety of safe alternative systems have been developed for use in smaller communities and more sparsely populated areas. These include septic tank systems with a common effluent disposal or septic tanks with a leach drain. These systems also use flush toilets, but have a septic tank for initial treatment of sewage close to the house before the effluent is conveyed via closed-pipe systems to a common secondary treatment system. The most common effluent disposal system is an underground leach drain in the immediate vicinity of the septic tank where effluent is degraded through natural processes.

Water-borne systems work well if they have adequate capacity and are

well maintained. However, excessive load on the system, flooding and breakdowns may result in leakage of raw sewage into the environment in the immediate vicinity of dwellings. This presents a major threat to human health.

Septic tank systems limit or eliminate the need for a community sewage treatment plant, depending on whether they are used in association with a common effluent disposal or with leach drains for each tank. These systems also work well if they are appropriately designed, have adequate capacity and are well maintained. It is essential that effluent disposal systems are an adequate distance from ground-water supplies to prevent contamination.

Where drinking-water supplies can be adequately protected, well-designed pit toilets may provide a good alternative that has particular advantages in terms of maintenance requirements and protection of the environment. Well-planned and maintained pit toilets have advantages in communities which are not permanently occupied or which have large fluctuations in population. The absence of flush toilets and pipe systems for transport of raw sewage simplifies maintenance and eliminates the risk



DAVID HANCOCK

of leakage. However, pit toilets should be designed to prevent the risk of flooding and to be protected from flies and vermin.

Pan systems require the regular (preferably daily) handling and transport of buckets of human waste, and pose a significant risk to the health of residents and those workers responsible for collection and disposal of sewage. Disposal of the waste may be uncontrolled and can lead to contamination of water supplies.

The development and maintenance of sewerage systems poses a number of significant challenges in many remote communities. The inappropriateness or inadequacy of many existing

systems, limited water supply, high building and maintenance costs, and difficulties in ensuring compliance with building codes are some of the challenges. Overcrowding caused by housing shortages and kinship obligations can over-burden existing systems.

The absence or failure of systems for the hygienic disposal of human waste increases the risk of a range of infectious and parasitic diseases that are spread via the fecal-oral route, including gastro-enteritis, hepatitis A, and strongyloidiasis.



NTDIPE



NTDIPE

Map 10

Main sewerage system

Map 10 shows the main sewerage system used in communities. The continued use of pan systems in a number of larger communities in the Torres Strait and one of the larger communities on the Western Australia coast is concerning.

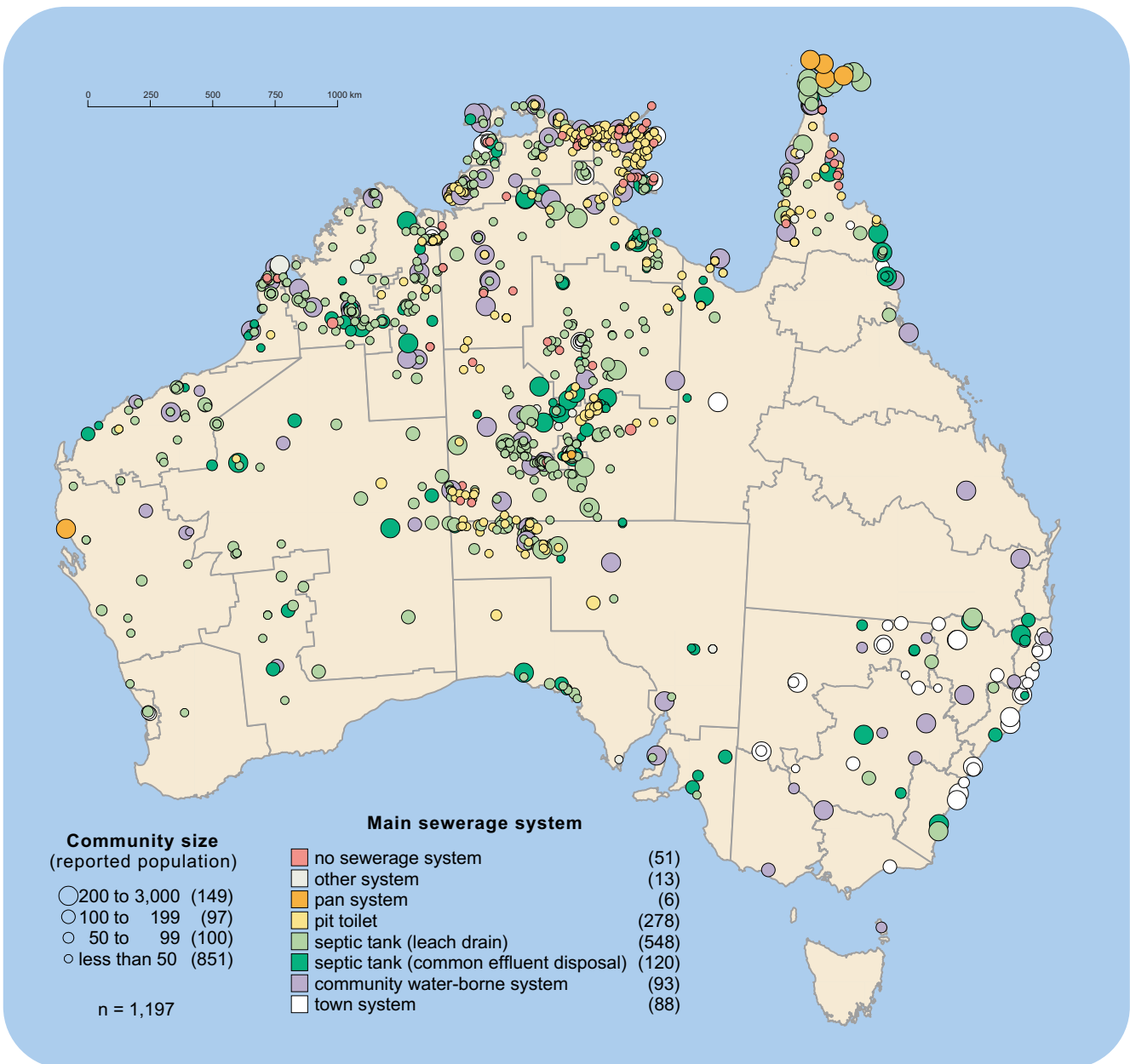
Communities in New South Wales are more likely to be connected to town sewerage systems, probably reflecting a greater proximity to towns or cities. Many other larger communities throughout the country

have their own community water-borne systems. Septic tanks with a leach drain are commonly used in remote communities of Northern, Western and Central Australia. Smaller communities (those up to 100 people) tend to use septic tanks with leach drains. Those communities with over 200 people can support full community water-borne systems.

In most communities the sewerage system was reported to be

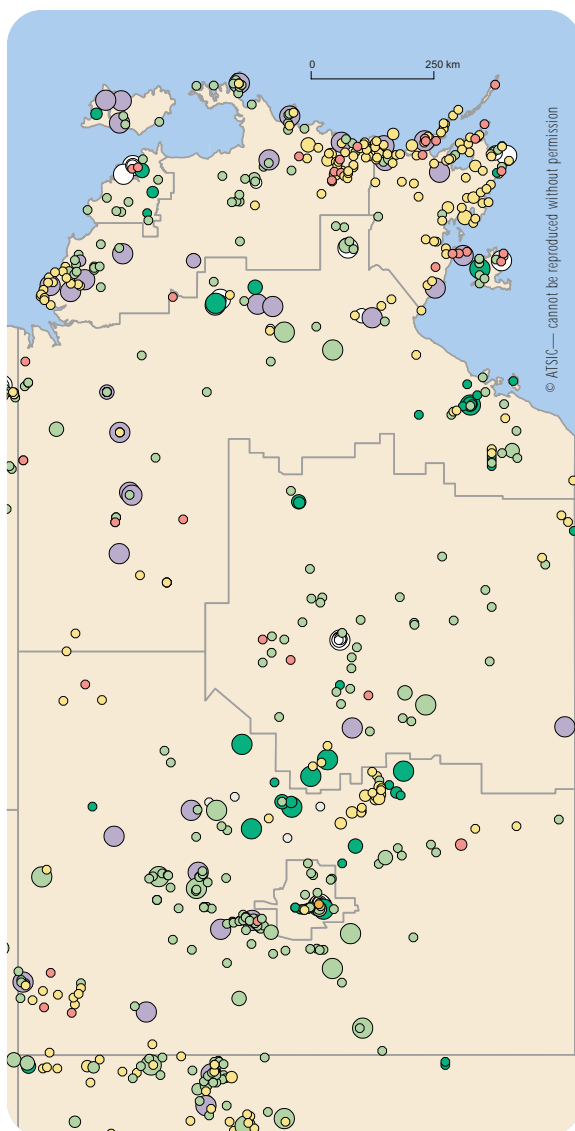
connected to all permanent dwellings. However, this was not the case for 36 communities in the Miwatj Region, 10 communities in the Jabiru Region, and other smaller communities scattered across the country (not shown here). Some of these smaller communities reported that a high proportion of the permanent dwellings had no sewerage disposal system.

A number of smaller communities in Northern and Central Australia

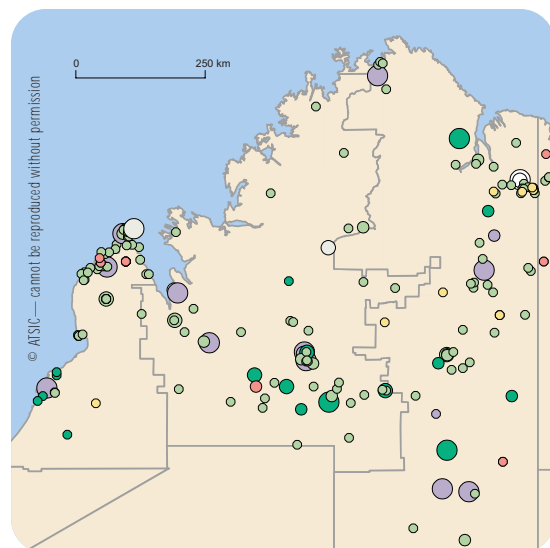


reported having no sewerage system. It is possible that this was due to a misinterpretation of the survey question, and that these communities rely on pit toilets.

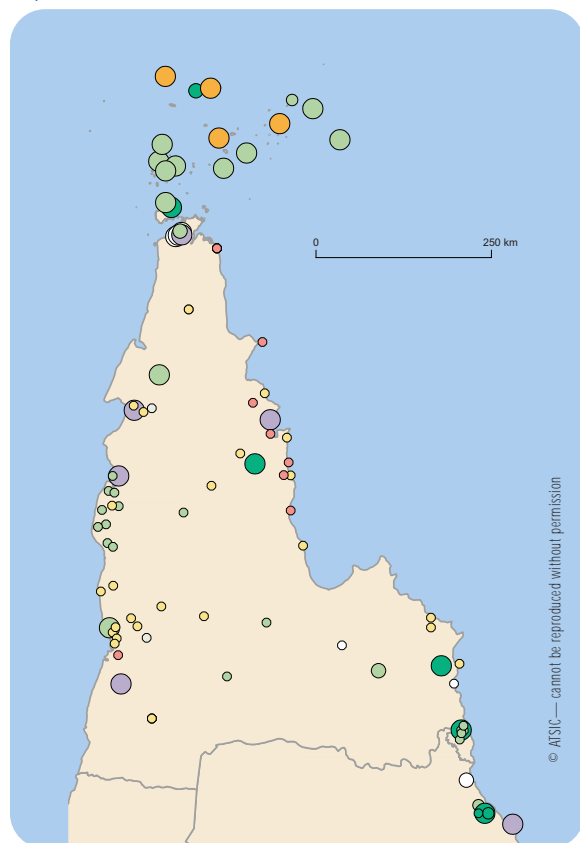
Northern Territory



The Kimberley



Cape York Peninsula



Map 11

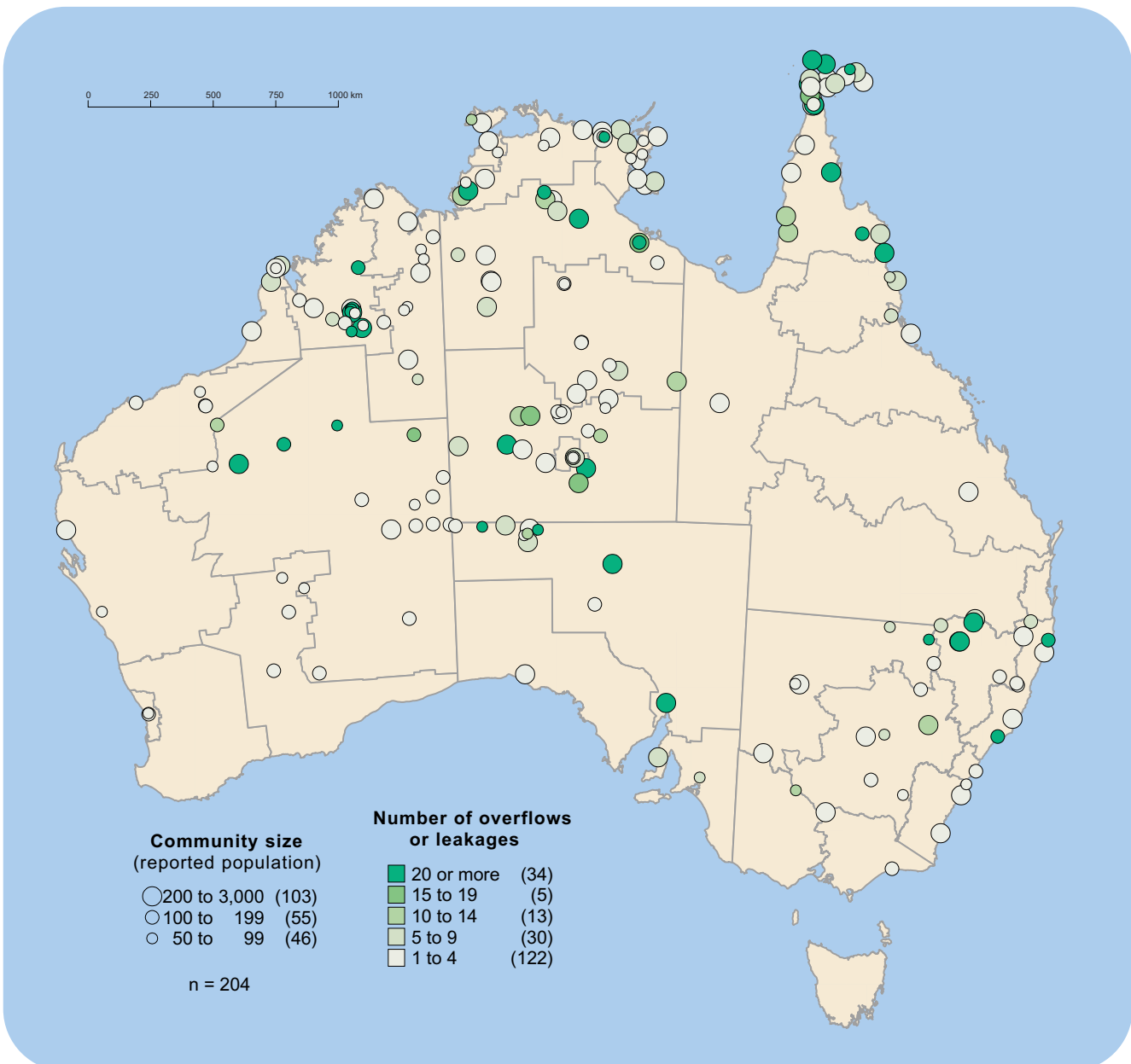
Number of sewage overflows or leakages

Map 11 shows the 204 communities that reported at least one sewage overflow or leakage in the 12 months preceding the survey. A significant number of communities reported 20 or more overflows or leakages in this period, and that this occurred in all states and the Northern Territory. The most commonly reported reason for overflows or leakages were 'blocked drains' and 'equipment failure'. A large proportion of communities in Central Australia and

the Torres Strait reported 'insufficient capacity of the septic system' as a reason for overflow or leakage. In a number of communities the proportion of permanent

dwellings affected by overflows or leakages was over 50%, with some communities having 100% of permanent dwellings affected.

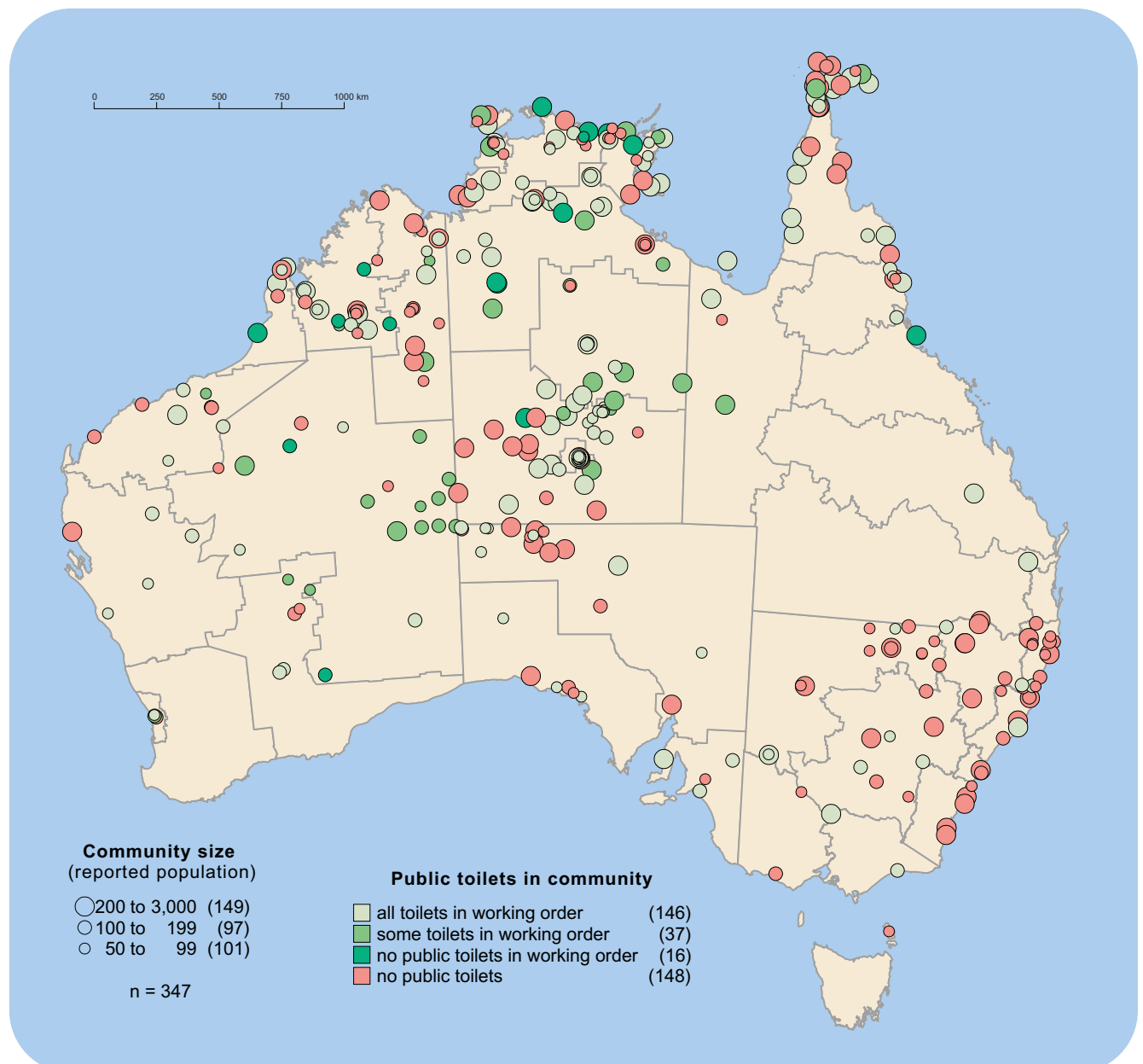
Seven communities reported that the leakages and overflows lasted for a year, and a further 10 reported leakages lasting for a month or more. The common occurrence of overflows or leakages of sewerage systems presents a major hazard to the health of the residents of these communities.



Public toilets in communities

Map 12

The availability of functioning public toilets in all communities is important in ensuring the safe disposal of human waste. However, the need for public toilets within communities is variable, and increases dramatically during major community events. Discrete communities that are located close to public amenities outside the community boundaries may have less need. Map 12 shows that many communities, including larger communities, have no public toilets.



RUBBISH DISPOSAL



Inadequate collection and disposal of rubbish presents a variety of risks to health. The risks include physical trauma from sharp or insecure objects, chemical poisoning from ingestion or use of contaminated containers, chemical burns, and food-poisoning from ingestion of contaminated food.

Inadequate disposal allows dogs to spread rubbish, attracts vermin that may be vectors for a variety of infectious diseases, and allows the breeding of insect vectors. Ideally, tips should be fenced to restrict access and contain wind-blown rubbish. Rubbish should be buried on a regular (daily) basis. Achieving this ideal presents major challenges because of the remoteness of many communities and the dis-economies of scale related to the small size of the vast majority of communities.

While burning rubbish may address some of the health risks, some risks remain and new risks are created. These include risk of fire and burns, residual risks of physical trauma, and air pollution.



DAVID HANCOCK

Frequency of organised rubbish collection

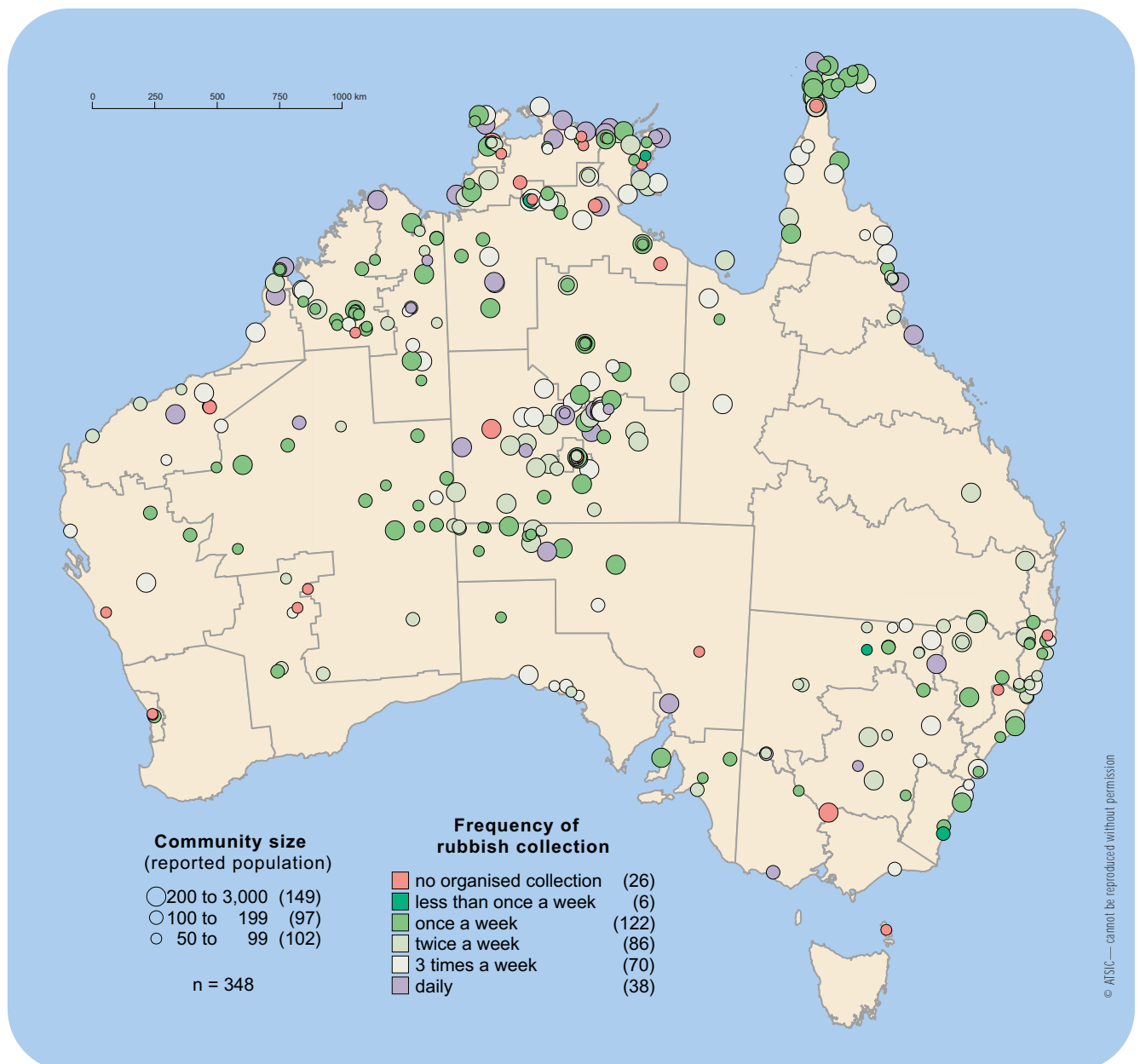
Map 13

Map 13 shows the frequency of organised rubbish collection in communities. A number of communities (including some larger communities) reported having no organised system for rubbish collection. A significantly larger number reported having collections once a week or less frequently. In the hot climate of much of Australia the collection of rubbish only once a week may be inadequate to discourage the breeding of insect

vectors of disease.

Communities in Queensland appear to have better serviced rubbish collection than most areas.

In the vast majority of communities, rubbish is collected from each dwelling in the community. In a small number of communities the collection is from a central point in the community.



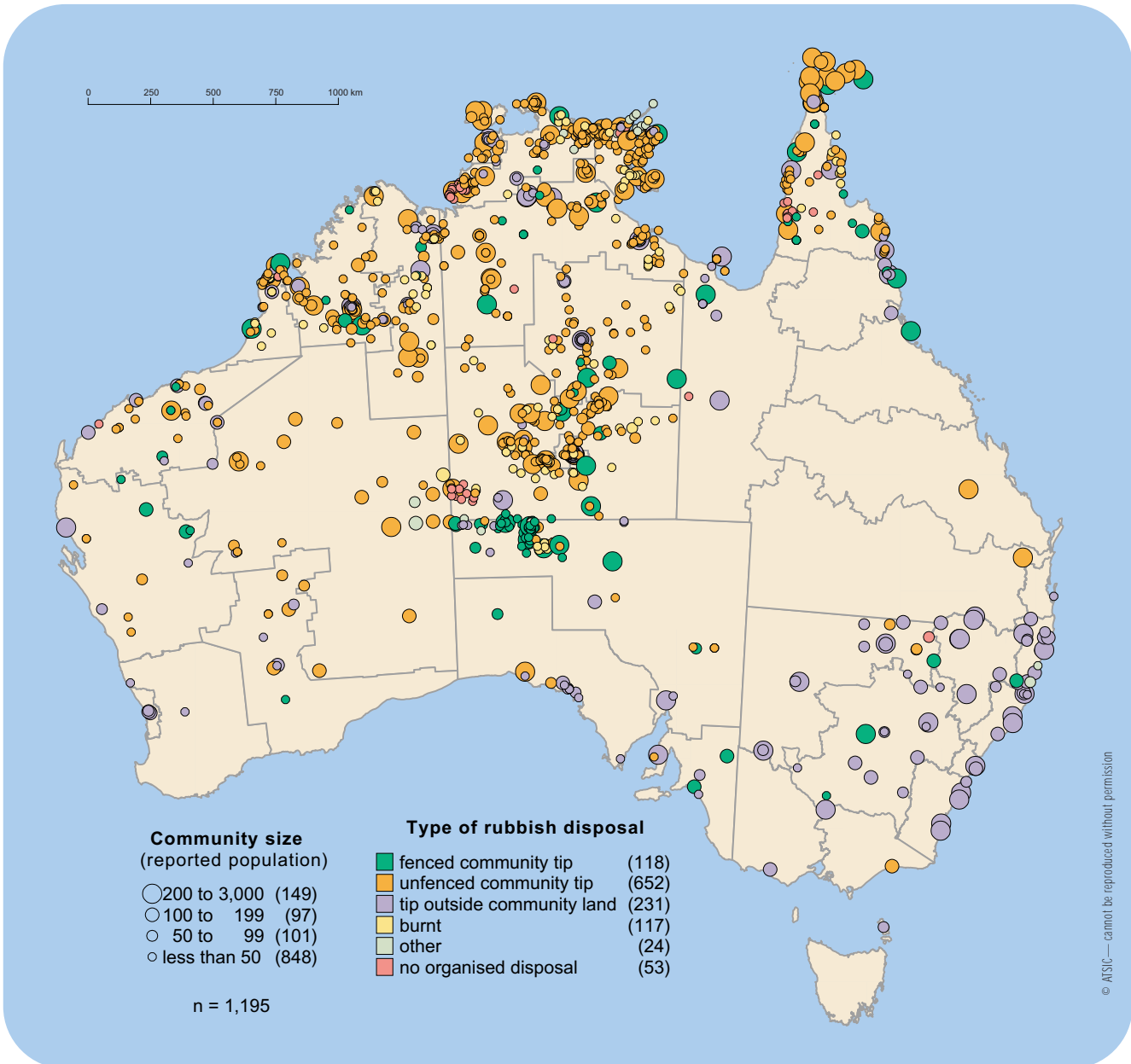
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Map 14

Type of rubbish disposal

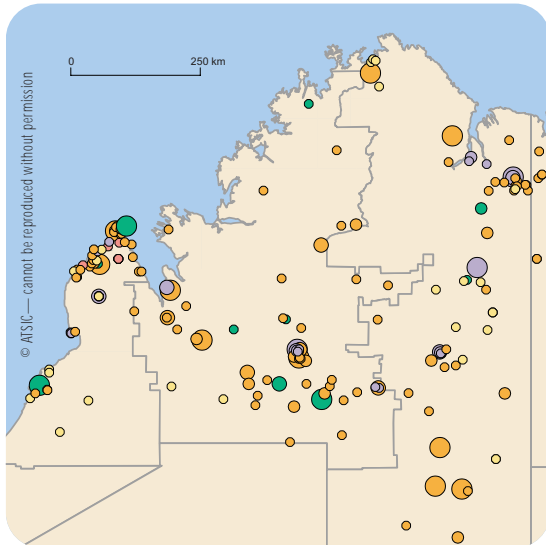
Map 14 shows that a large number of communities in Central and Northern Australia, and in Western Australia, dispose of their rubbish in unfenced community tips. Some of the larger communities and a few smaller communities have fenced community tips, particularly in northern South Australia. Most communities in New South Wales, and a small number of the larger communities in other areas, use tips outside community land. These are

probably shared with and serviced by adjacent towns. A large number of small communities in Central and Northern Australia burn their rubbish. A few small communities reported no organised rubbish disposal.



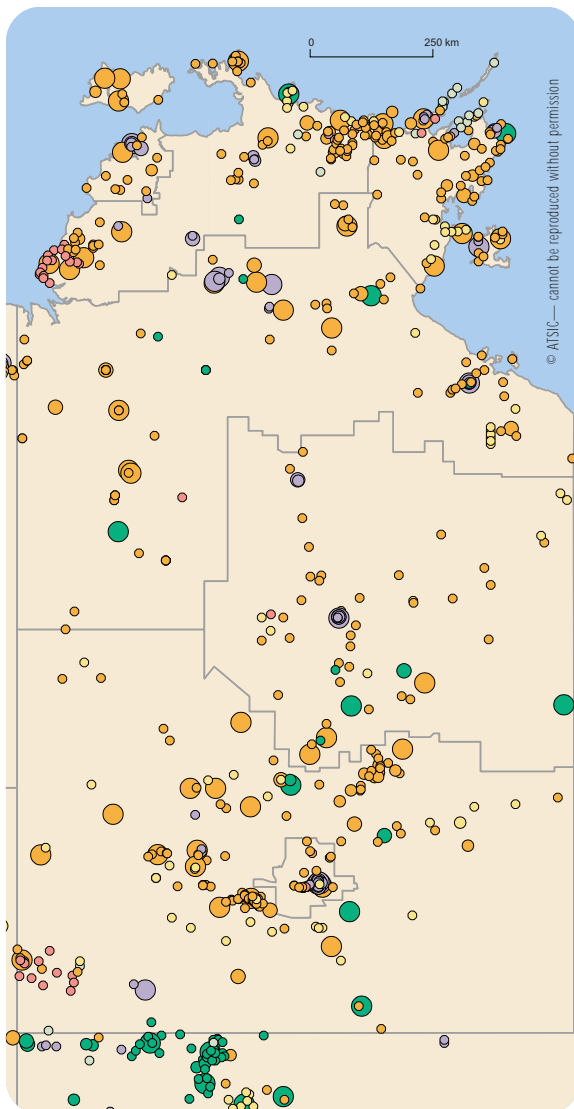
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The Kimberley

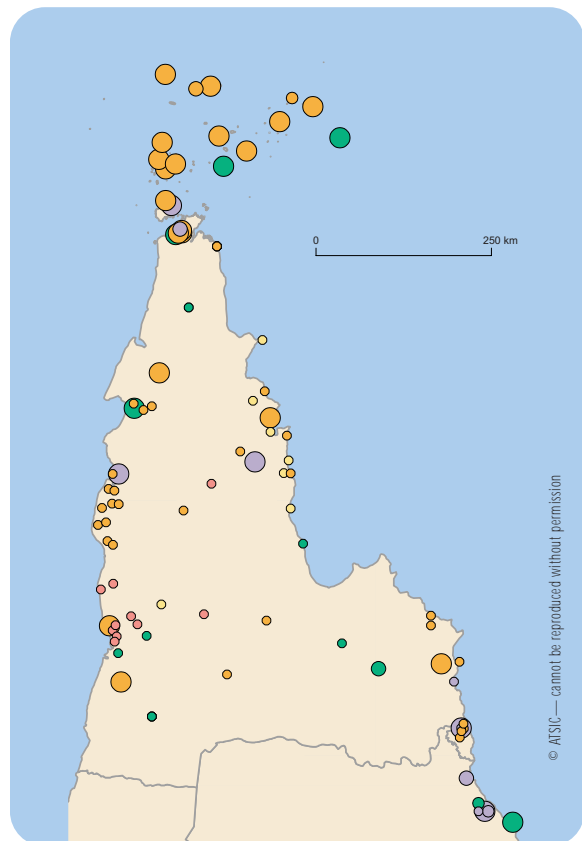


Six hundred and fifty-two communities dispose of their rubbish in unfenced community tips.

Northern Territory



Cape York Peninsula and Torres Strait Islands





POWER SUPPLY

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he availability of a reliable and safe supply of electrical power provides a number of health benefits to

community residents. The more direct benefits include: a safe and efficient power source for cooking; heating or cooling the house; hot water; and capacity to run a number of household appliances, such as refrigerators and washing machines, that contribute to household and personal hygiene, and to food quality. Lighting contributes to quality of life and to educational or study opportunities with consequent health benefits. At a community level, power is required for water pumps, workshops, lighting, community stores, health clinics and hospitals, educational facilities, and business enterprises.

The absence of an electrical power supply causes people to rely on alternative energy sources that frequently pose a risk to health. For example, the use of open fires for cooking or heating indoors affects indoor air quality and may impact on the respiratory health of household residents. Open flames from fires, candles or gas increase the risk of fire. The use of petroleum products in fuel stoves or heaters also increases the risk of fires, and

presents a poisoning hazard for young children.

Different sources of electrical power supply impact on the local environment in ways that may affect health and quality of life, either directly or in terms of relative cost. The state grid provides a generally reliable source of power. Community generators, when used inappropriately, may be a source of noise and air pollution, require regular maintenance and often cannot guarantee 24-hour supply. Fuel costs can be very high and fuel supply can be unreliable. Domestic generators are a cost to individual households, and, depending on the capacity of the household to maintain the generator, they may be more or less reliable. The noise and air impacts of domestic gensets are greater than from community generators as they are closer to dwellings. Solar systems are expensive to install, but are a cleaner energy source and offer low operating costs. Generally, community-based systems require a degree of community support to encourage efficient energy management and maintenance of the system.



LEFT: UNKNOWN RIGHT: DAVID HANCOCK



RUSSELL GRUEN

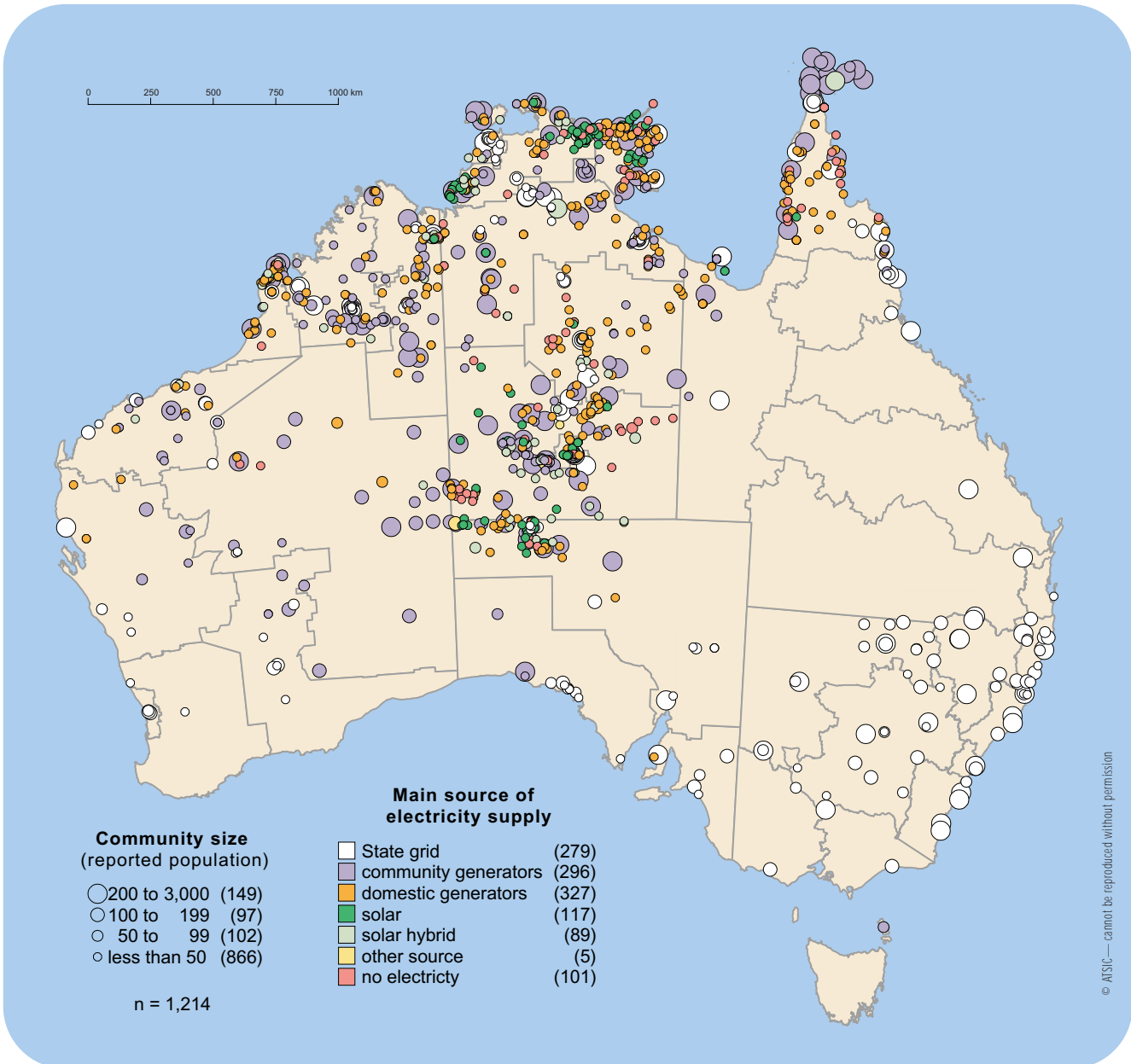
Map 15

Main source of electricity supply

Map 15 shows the main source of community electricity supply to vary across the country. Communities in New South Wales and southern Queensland are striking in their universal access to power from the state grid. This reflects the general level of infrastructure development in these states and the geographic distribution and size of communities. A number of other communities close to the Stuart Highway (the main north-south road in South Australia

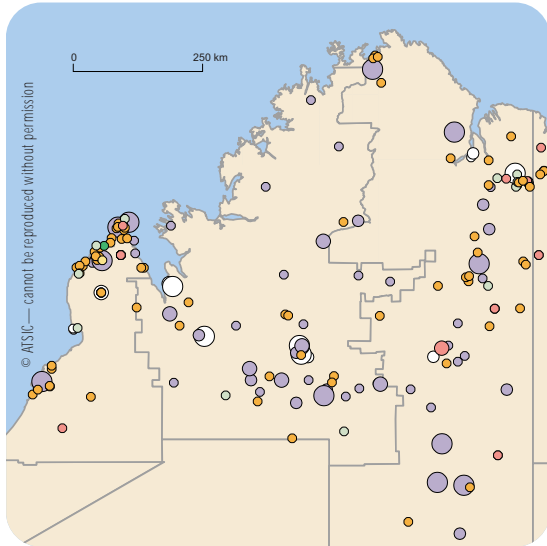
and Northern Territory) or on the main coastal highways also have power from the state grid. Most other large communities rely on community generators, while many small communities use domestic generators. Some smaller communities in Central and Northern Australia, and one larger community in the Torres Strait, rely on solar power. A number of small communities in Northern and Central Australia have no access to electricity.

Many of the smaller communities and a few larger communities in Northern and Central Australia report that not all permanent dwellings are connected to electricity, and the proportion not connected tends to be higher in the smaller communities.

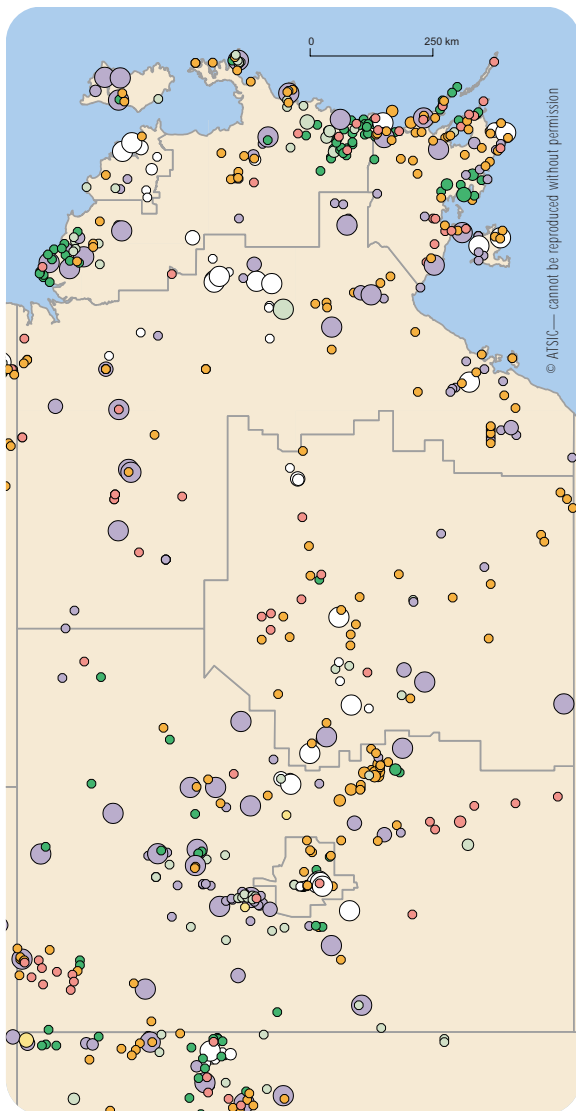


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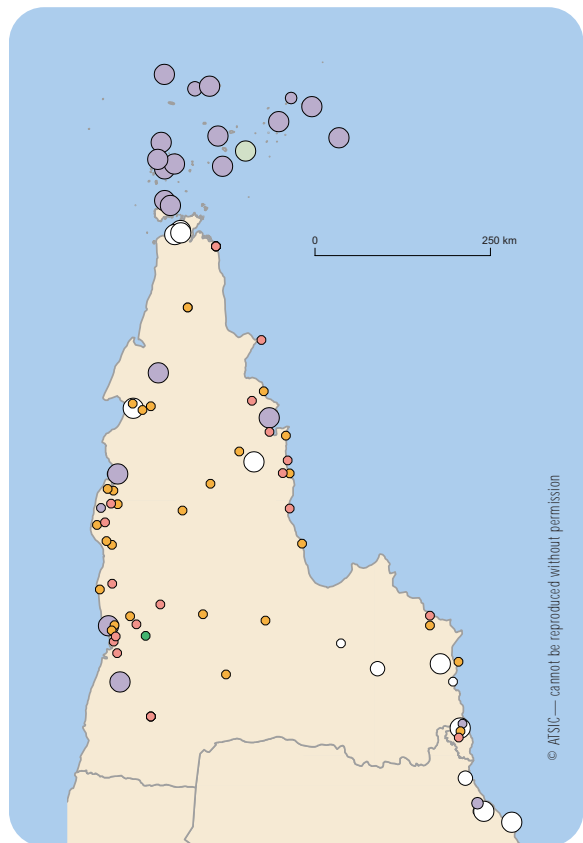
The Kimberley



Northern Territory



Cape York Peninsula and Torres Strait Islands



Map 16

Number of power interruptions

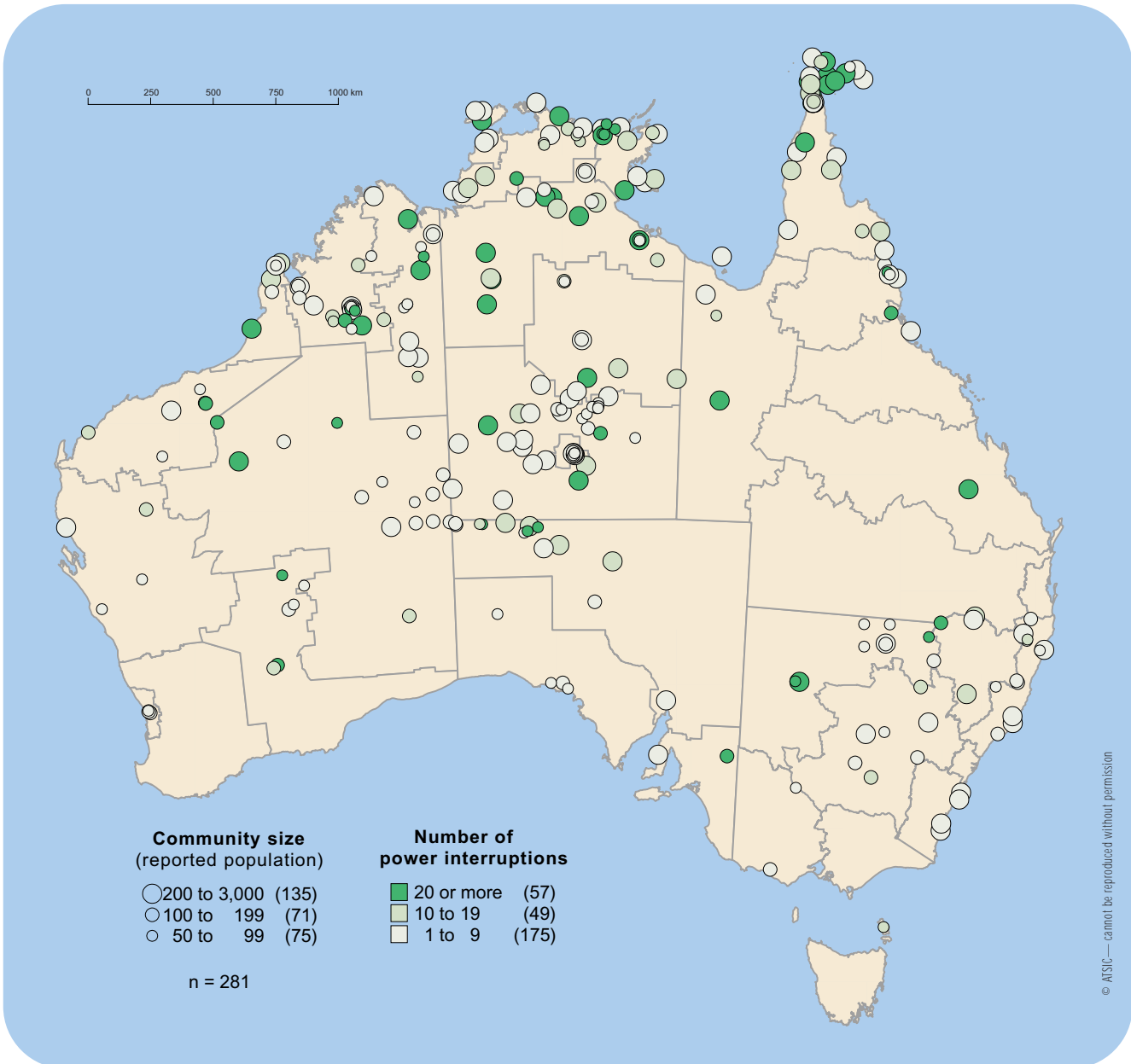
Map 16 shows that 57 communities experienced 20 or more power interruptions in the 12 months preceding the survey. Twenty-five of these communities were in areas serviced by the state grid.

The most common reason reported for power interruptions was 'equipment breakdowns'. Communities affected by such breakdowns were less likely to be in those areas serviced by the state grid. Other reasons included 'storms' and

'planned outages'.

The main reason for power interruptions in those areas serviced by the state grid were 'storms' and 'equipment breakdowns' (16 of each in a total 48 reasons given). Storms were the main reason for interruptions across all regions. There were several reports of no fuel as the reason for power interruptions.

Twenty communities reported at least one power interruption exceeding one week. Five of these communities had more than 20 such interruptions in the year preceding the survey.



COMMUNICATIONS & TRANSPORT

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he ability to travel in and out of communities and to communicate with other communities and service centres has

direct health effects in terms of access to regular and emergency health services. Many communities have limited on-site health services and rely on provision of services by personnel based in other centres. Functioning transport systems are essential for the regular supply of food, especially fresh food. The maintenance of a variety of other infrastructure that impacts on health is also dependent on functioning communications and transport networks.



ABOVE LEFT: NTDIPE REST: RUSSELL GRUEN



Map 17

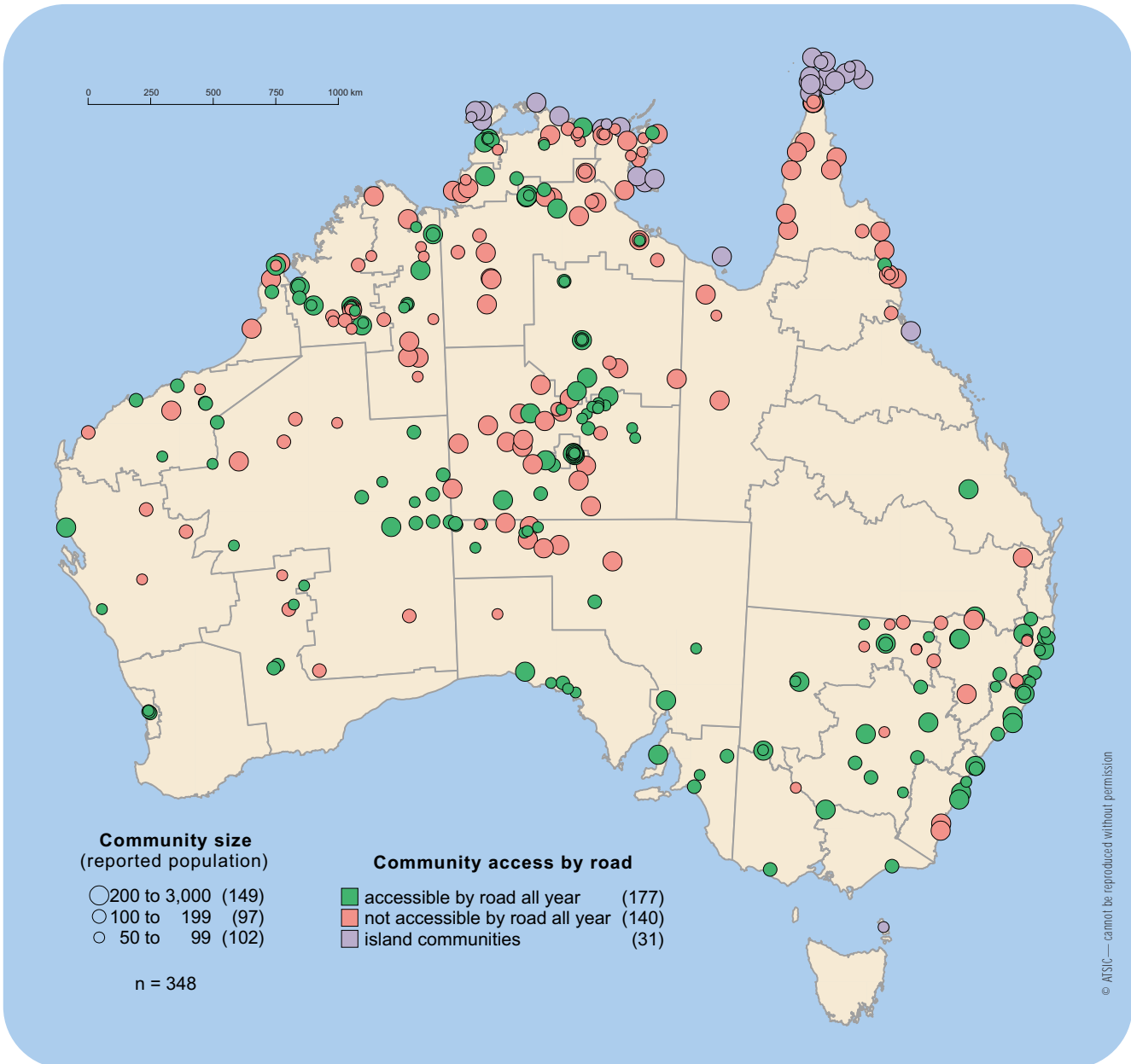
Community access by road

The remoteness of many communities and seasonal weather effects (particularly in Northern Australia) mean maintaining accessibility is difficult and expensive. Map 17 shows that 40% of communities of 50 or more people across the country do not have year-round road access. This includes 73 communities with a population of 200 or more. As expected, communities in Central and Northern Australia are more likely to be affected, but there are a number

of communities in the south-east of the country that are also affected.

The map also illustrates the 31 island communities that by definition do not have road access from the mainland.

Thirty-seven communities had road access cut off for periods exceeding three months, including 14 communities for six months or more. Twenty-six communities had road access cut off five times or more during the year.

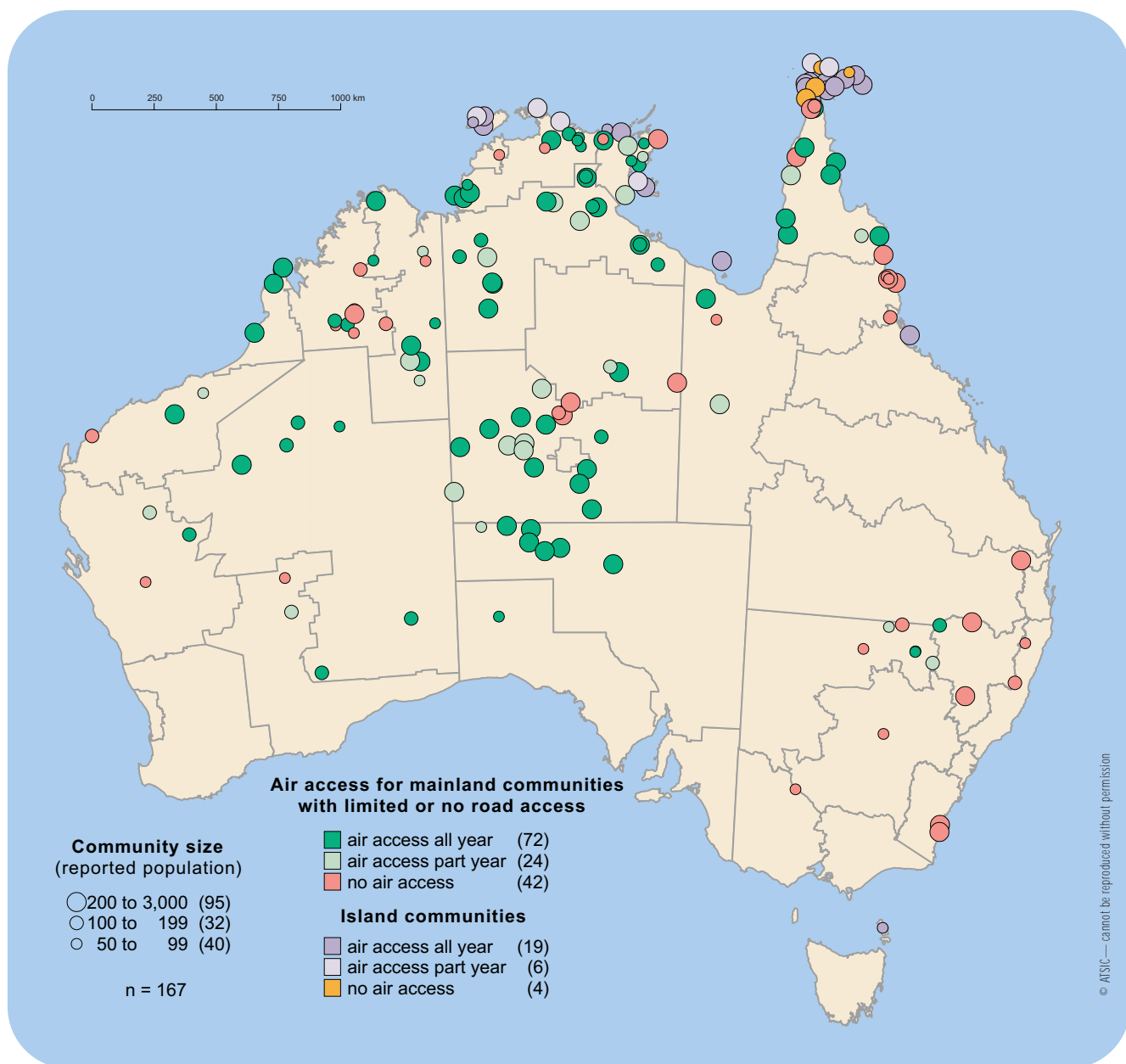


Air access for communities with limited or no access by road



Map 18

Map 18 shows that there are a number of island communities that do not have year-round air access, and a few with no air access. The map also shows there are 764 communities that are more than 60 minutes travelling time from the nearest town that have no, or limited, air access.



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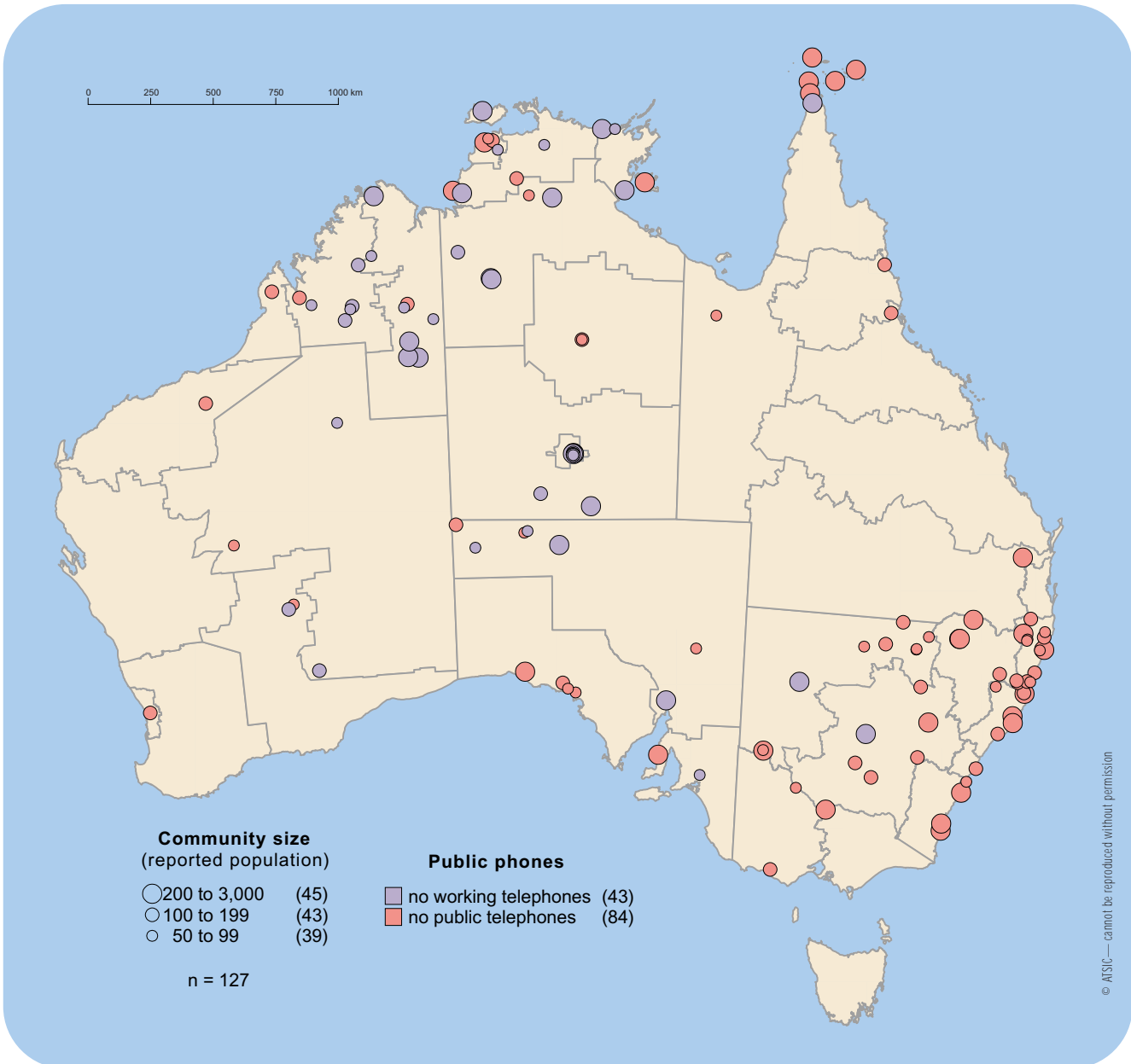
Map 19

Number of public phones in working order

Telephone communication is important for a variety of emergency, work, personal and family reasons and may impact more or less directly on health. Poor people are less likely to have a private phone in their dwellings or access to a phone through a place of employment. This situation is exacerbated by remoteness. The availability of functioning public phones is, therefore, very important in providing telephone communication

in Indigenous communities.

Map 19 shows that most communities had at least one public phone in working order. There is a significant proportion of communities, including larger communities, that had no public phones in working order.



ROADS WITHIN COMMUNITIES

Sealed roads in communities improve road safety, and reduce dust in the community environment and within dwellings. Exposure to dust is believed to be an important factor in respiratory, skin and eye health problems for people in Indigenous communities. Dust is believed to assist the transmission of pathogenic organisms, affects personal and household hygiene, and spoils the aesthetic qualities of local environments.



BEN WARD



UNKNOWN

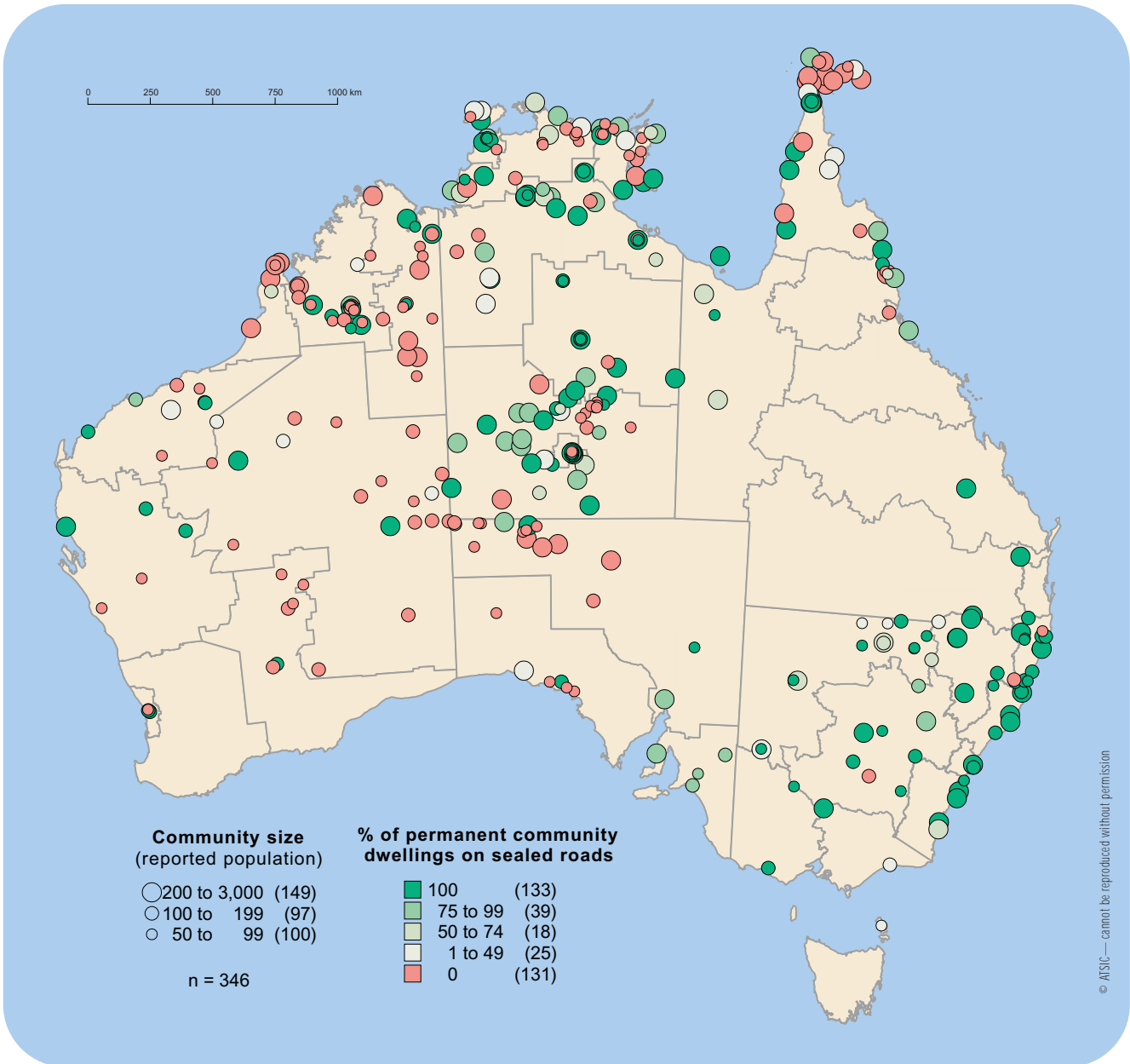


Map 20

Proportion of permanent dwellings beside sealed roads

Map 20 shows that in many communities in Central, Northern and Western Australia no permanent dwellings are adjacent to sealed roads. This includes a significant proportion of larger communities. New South Wales and southern Queensland are notable in having a high proportion of communities with all permanent dwellings beside sealed roads.

There were 4691 dwellings in 209 communities on unsealed roads. One hundred and fifty-six communities had at least 50% of their dwellings on unsealed roads. Seven communities with over 100 houses had more than 50% of their houses on unsealed roads.



EDUCATION

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here is strong and consistent evidence that improved education impacts positively on health. This may occur through a variety of mechanisms, including through direct knowledge of healthy living practices, improved access to health information, and improved prospects for employment, financial security, and a safe and healthy living environment. The educational level of mothers, in particular, has been shown to be a strong determinant of child health. Improved education may operate at a community level, with strengthening of local capacity and community self-reliance.



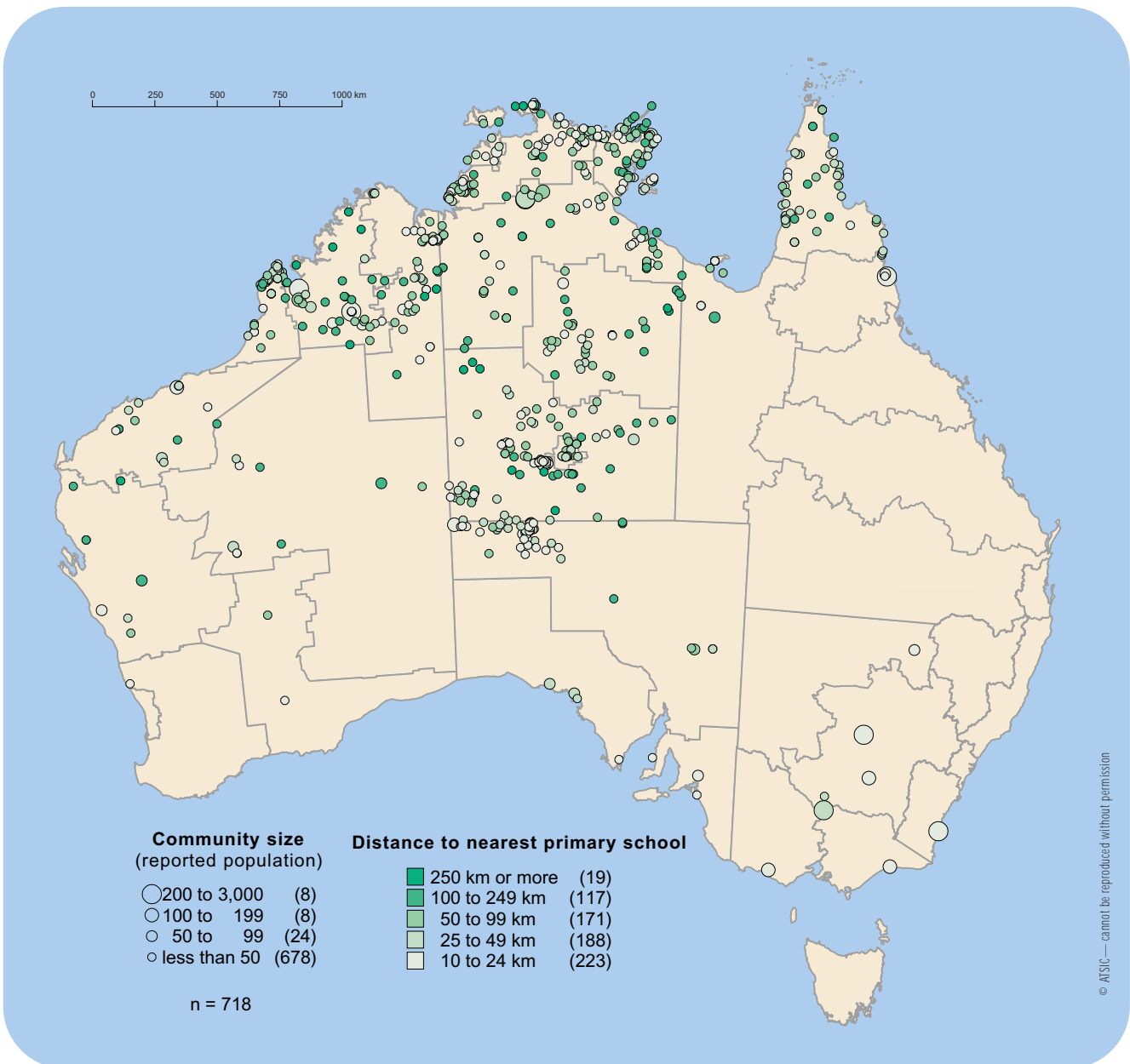
BOTTOM: DAVID HANCOCK; REST: RUSSELL GRUEN

Map 21

Distance to the nearest primary school for communities, where the distance is more than 10 km

Map 21 shows that there are a large number of communities where the distance to the nearest primary school is such that it would interfere significantly with, or preclude, the possibility of children resident in these communities attending school. This is particularly an issue for smaller communities in Northern and Central Australia. However, there are some larger communities where the distance to the nearest primary school is 25 km or more.

Seven hundred and eighteen communities were over 10 km from a primary school, and of these 40 had a population of over 50 people. Fifteen communities with a population of over 50 people were more than 25 km from a primary school. One thousand and sixty-two communities were over 10 km from a secondary school, of these 192 had a population of over 50 people.



HEALTH FACILITIES & HEALTH PERSONNEL

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he distance to health facilities and the availability of health personnel are two important dimensions of access to health care. The physical proximity of health services, and the availability of health personnel with whom community residents can readily and effectively communicate facilitates the prevention, early diagnosis and treatment of disease. The proximity of health services and health personnel may allow an improved understanding of the impacts that the physical and social environments have on the health status of the community. An understanding of these impacts means that appropriate policies, services and interventions can be developed locally.



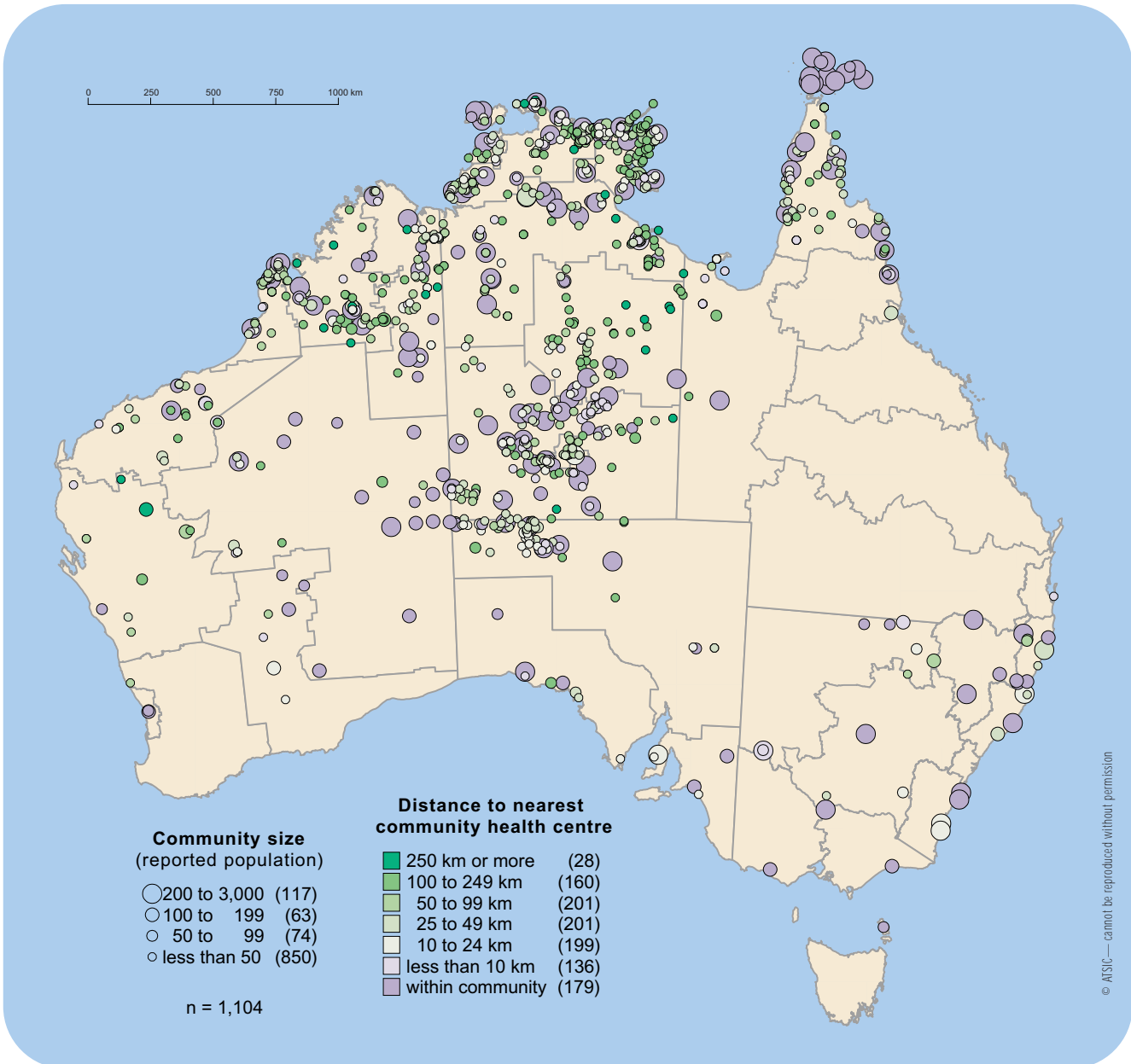
FAR LEFT: NTDIPE. REST: RUSSELL, GRUEN

Map 22

Distance to the nearest community health centre

For the purposes of this survey a community health centre was defined as a facility that provides a range of medical and health-related services to the community. Generally, the centre would have a nurse, an Indigenous health worker and a doctor in regular attendance. Map 22 shows that almost all larger communities have a health centre within the community. For those few where this is not the case there is, in almost all cases, a health centre

within 25 km, and usually within 10 km. However, there are many smaller communities, mostly in Northern and Central Australia, where the distance to the nearest health centre is 250 km or more. This presents a significant barrier to access to primary health care for people living in these communities.

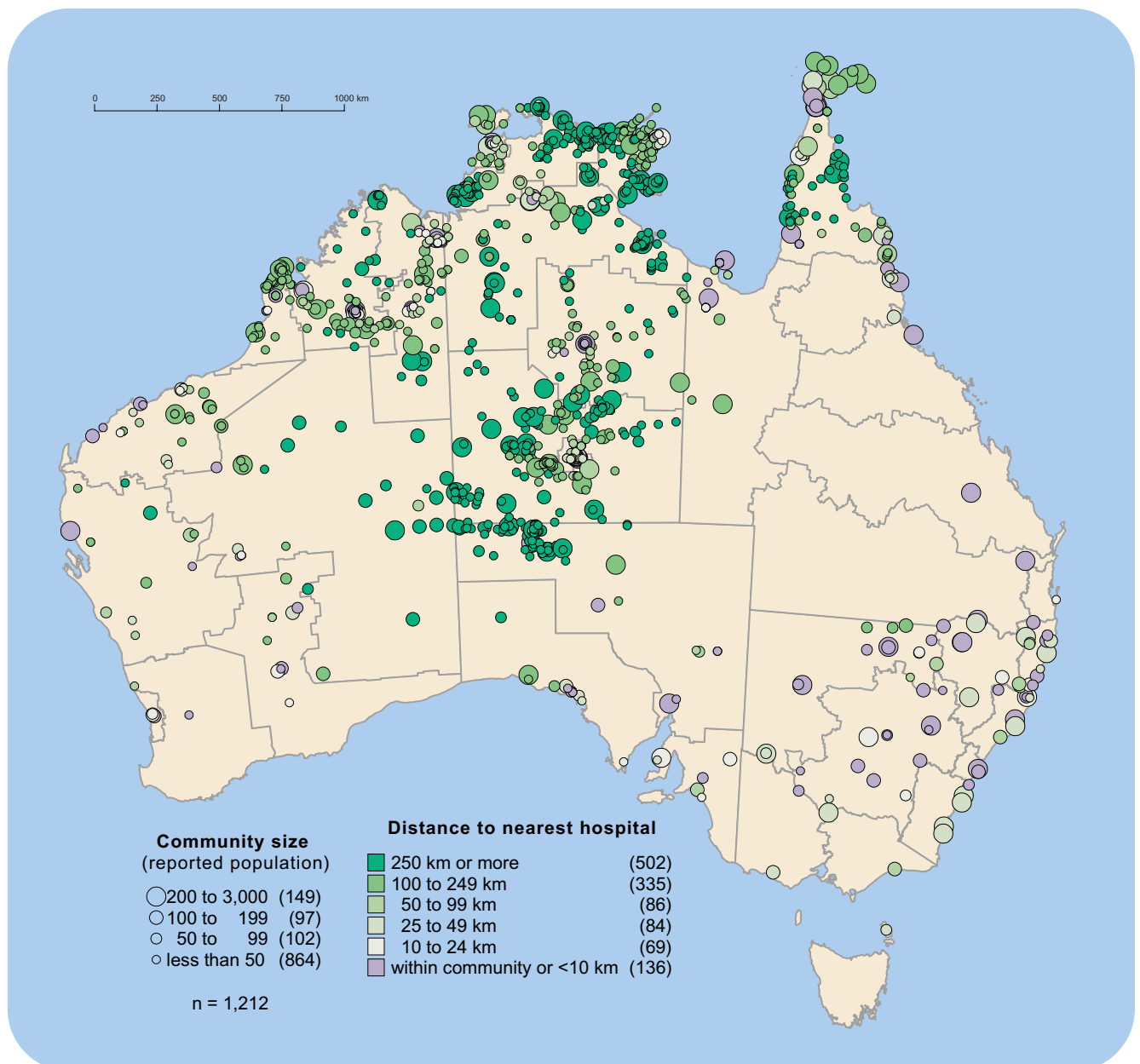


Distance to the nearest hospital

Map 23

For the purpose of this survey, a hospital was defined as any building in which doctors or nurses provide medical assistance and where people could be admitted overnight if necessary. Map 23 shows that there are a large number of communities, including larger communities, that are 250 km or more from the nearest hospital. These communities are in Northern, Central and Western Australia. Few communities in New South Wales are more than 100 km

from the nearest hospital, again probably reflecting the general proximity of communities in this State to towns or cities. A number of communities indicated they had a hospital within the community while neighbouring communities indicated they were over 100 or 250 km from a hospital. These data anomalies are apparent on the map.



Map 24

Length of time that an environmental health worker has worked in a community

Environmental health workers (EHWs) are generally trained to certificate III level or equivalent, and have a community-based role in inspecting and reporting on environmental health aspects of community housing and infrastructure. They have a role in surveillance of the community environment, the coordination or conduct of minor repairs, and community education. EHWs are generally Indigenous residents of a local community.

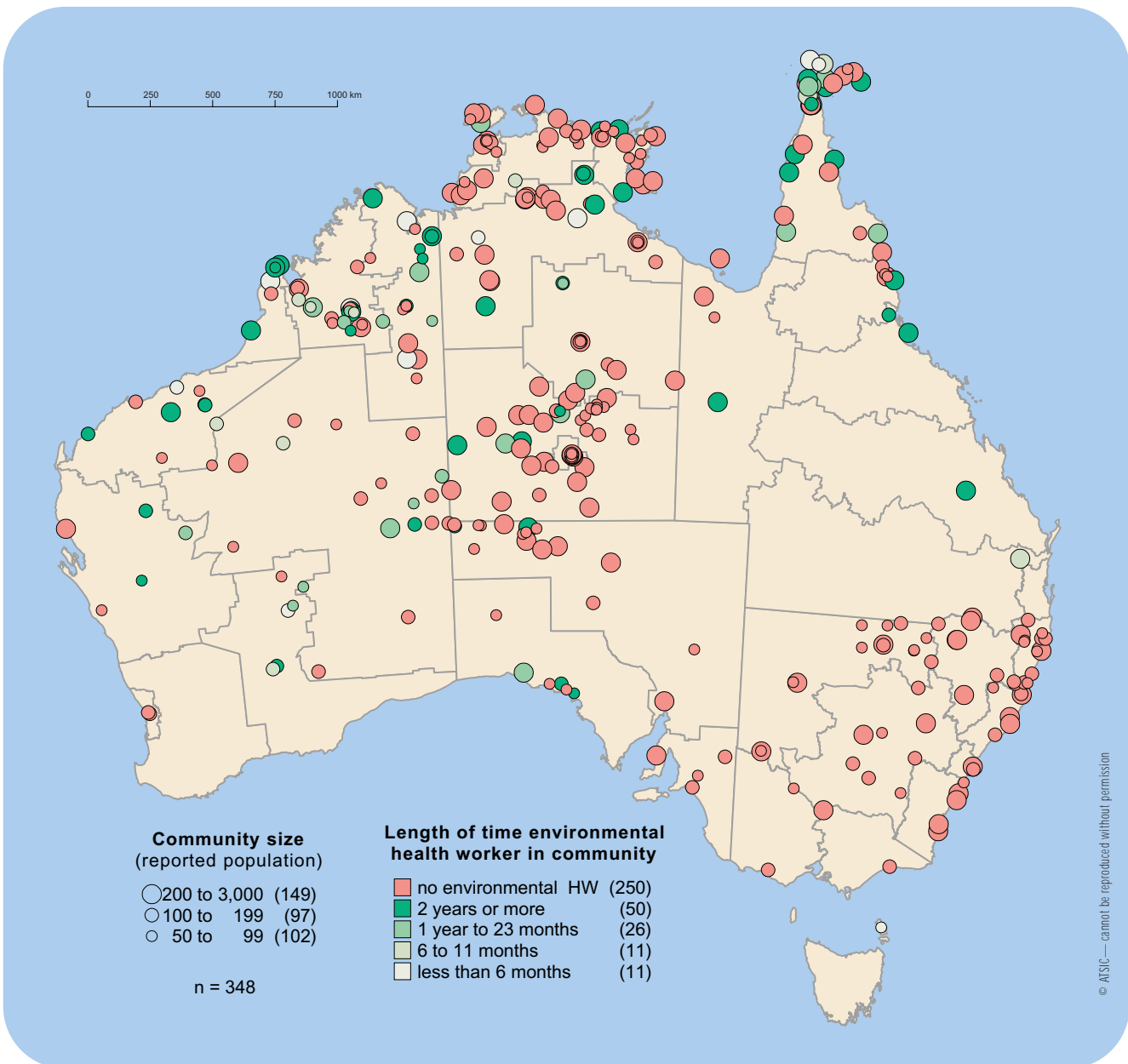
The policies governing the training

and employment of EHWs varies between states. There are no EHWs in New South Wales and Victoria, and South Australia provides no formal training for their EHWs. In the absence of EHWs, the role of inspecting, reporting and maintaining health-related infrastructure falls on other community workers and residents. Staff with higher levels of training in environmental health or community development such as environmental health officers (EHOs) and community

development officers (CDOs) are generally few in number and are frequently responsible for a large number of widely dispersed communities.

Map 24 shows only communities of 50 people or more, and that relatively few of these communities have an EHW.

Ninety-eight communities indicated they employed an environmental health worker.



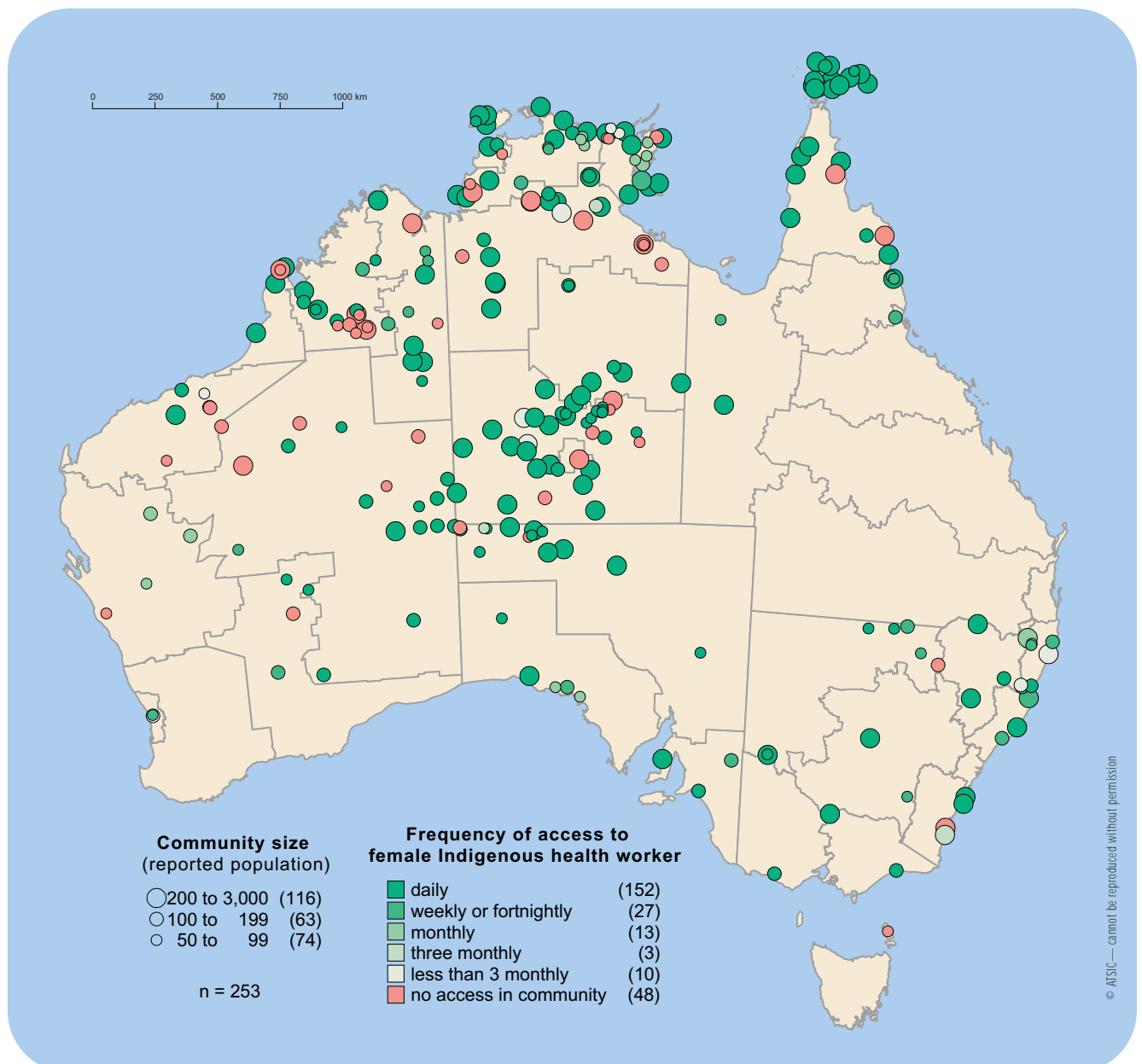
Frequency of access to female Indigenous health worker in community

Map 25

Indigenous health workers are trained to certificate level and are often the first point of contact in primary health care. They are expected to fulfil a number of roles, both by the departments of health that employ them and the communities in which they work. As well as curative services, they often have a key education role about disease prevention and health promotion. Some of these programs are discussed later in this atlas. Health workers are often called to coordinate the visits of

other health practitioners to the community. This entails organisational aspects and cultural and language interpretation.

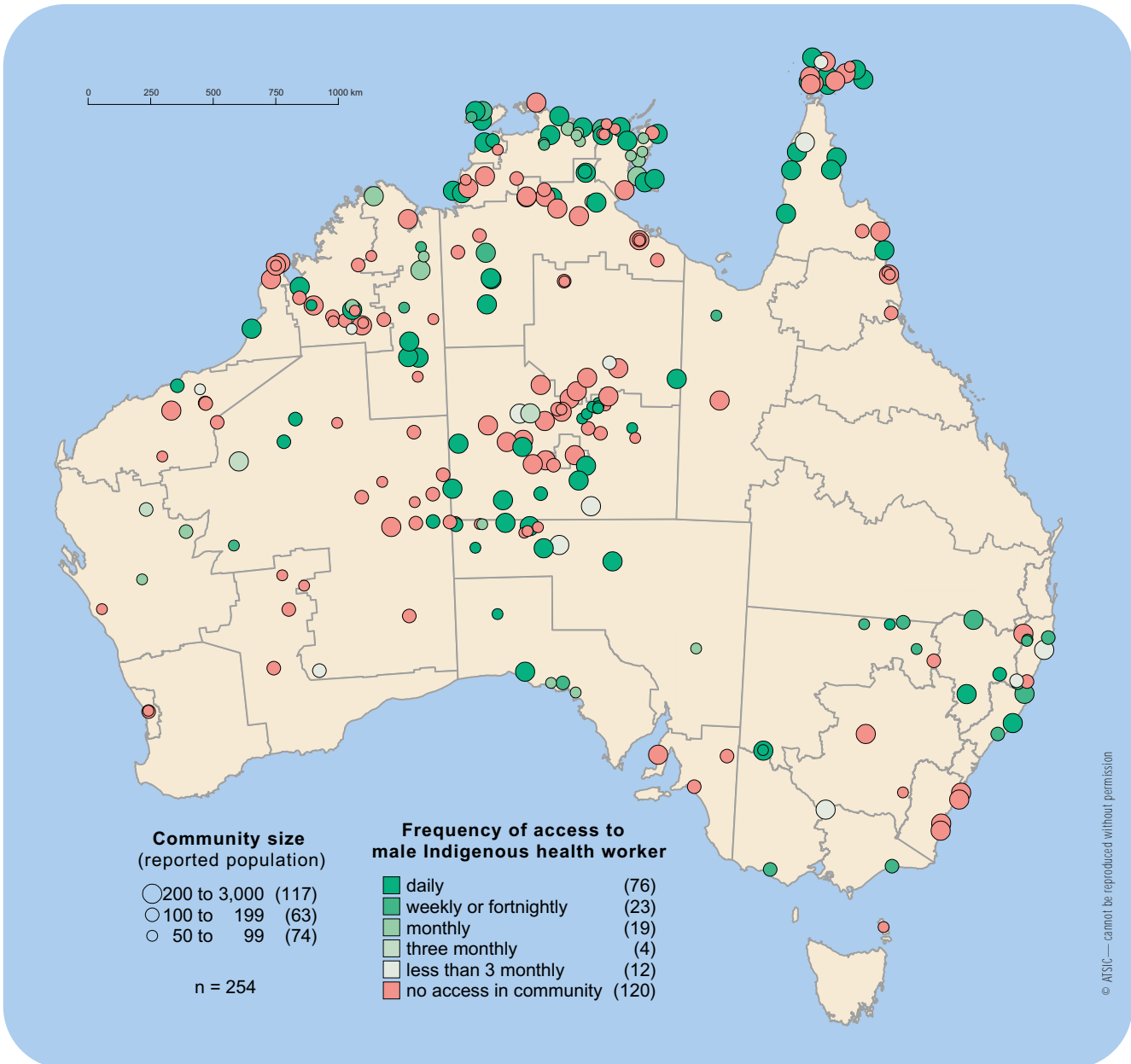
Having both male and female Indigenous health workers in a community helps address issues of avoidance relationships and the cultural separation of men's and women's business. Map 25 shows that most communities of 50 or more people have daily access to a female Indigenous health worker.



Map 26

Frequency of access to male Indigenous health worker in community

Map 26 shows that relatively few communities have access to a male Indigenous health worker, and that while access in the Top End is also limited these communities appear to have better access than communities elsewhere. Male Indigenous health workers are more likely to have been present in the communities for less than six months than their female counterparts.



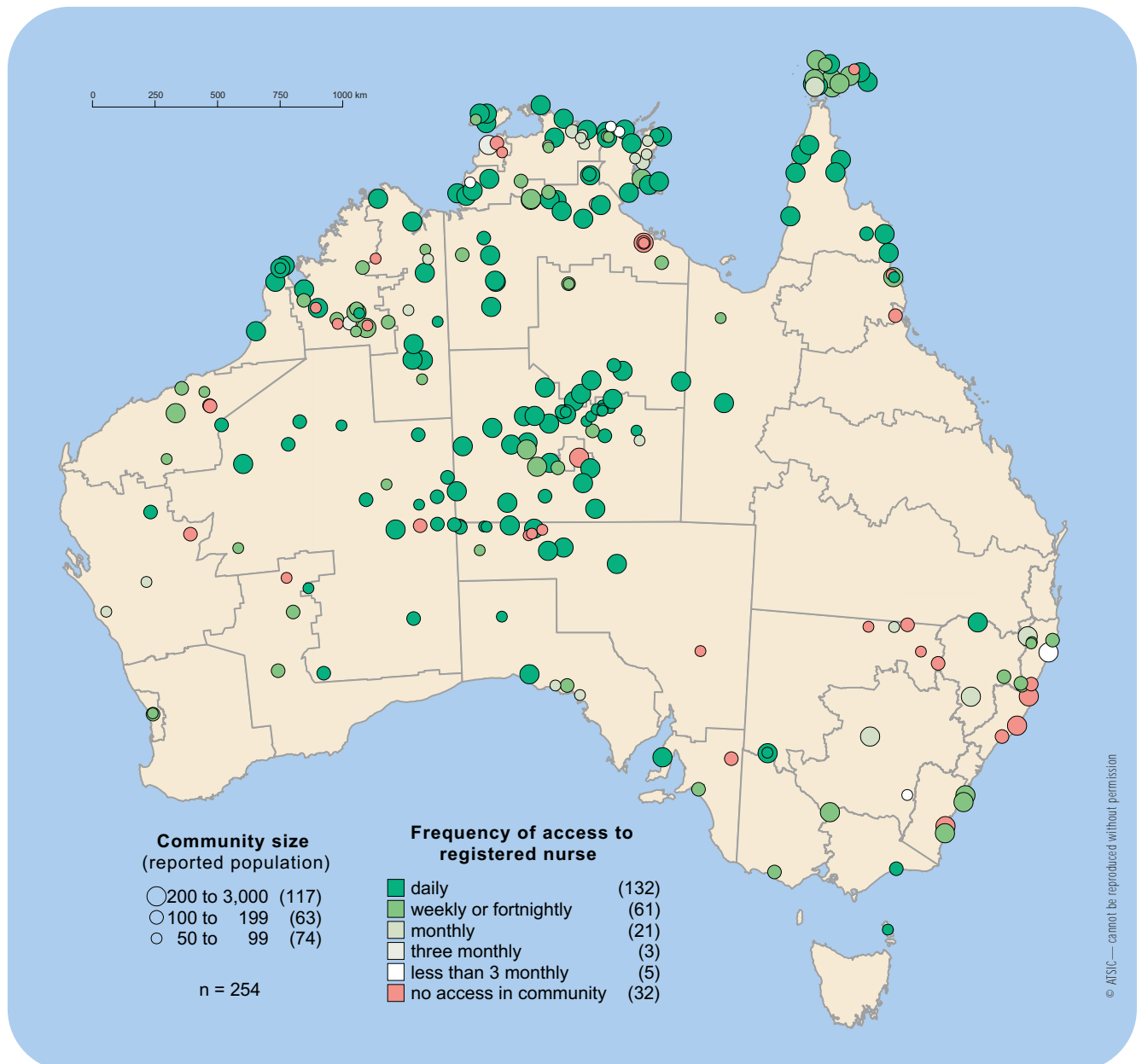
Frequency of access to registered nurse

Map 27

Nurses play a very important role in primary care services in Indigenous communities. They need to deal with a wide range of routine and emergency situations, often in locations where there is no resident doctor and that are long distances from hospital services.

Map 27 shows that most communities of 50 people or more have daily access to a registered nurse, highlighting the important contribution nurses make to primary

care services. However, there are 61 communities of 50 people or more that have no access to a nurse in the community or where the nurse only visits monthly or less frequently. Frequency of access to nurses within communities appears especially low in New South Wales, and this may be because the main sources of primary care are in nearby towns or cities.

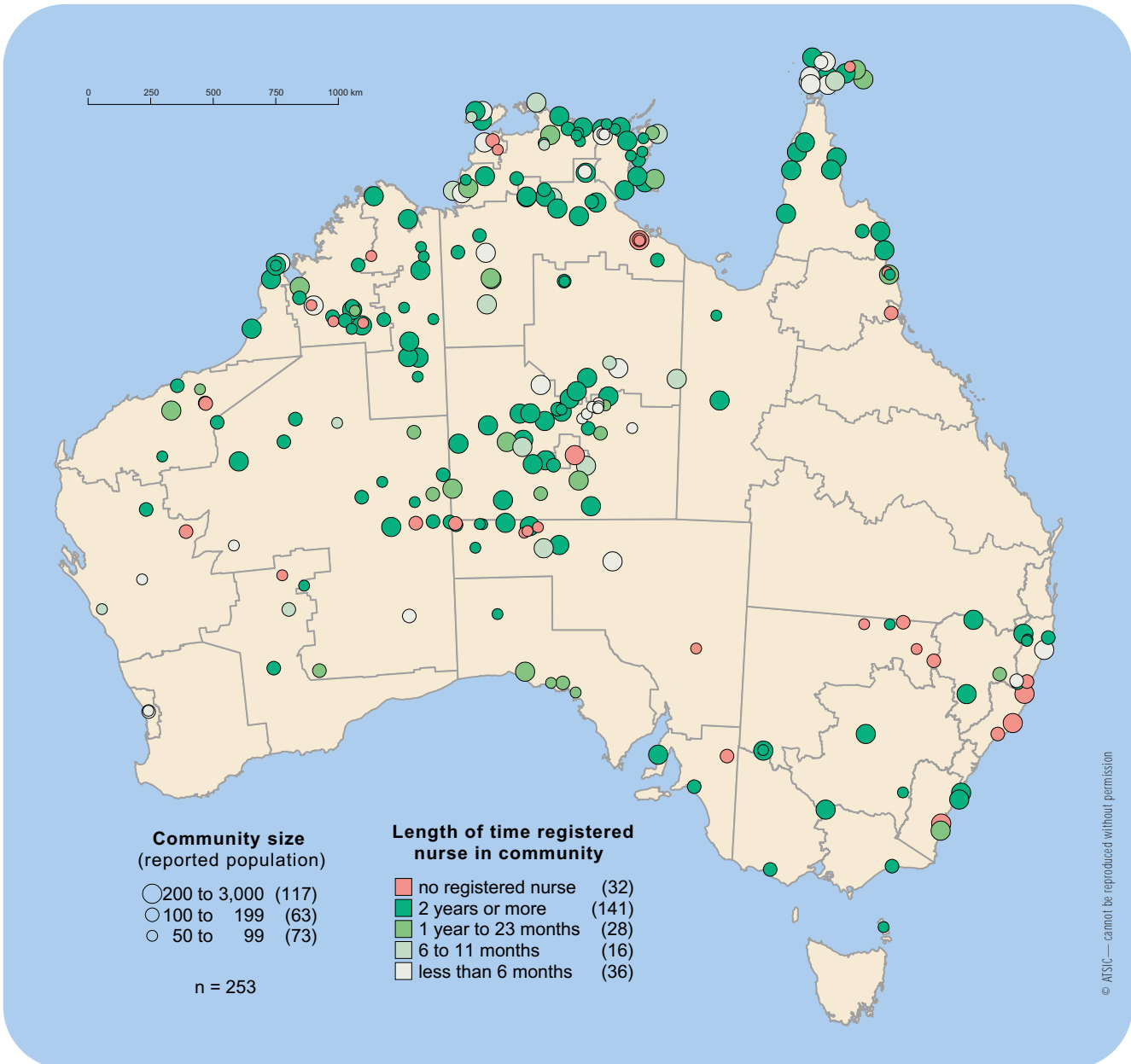


Map 28

Length of time registered nurse in community

Map 28 shows that for many communities the length of time a registered nurse has been in the community is less than six months. This probably reflects the challenging nature of the work and the working environment, and the consequent high staff turnover. The inability to adjust to a different culture, professional and cultural isolation, physical hardship and danger, and short-term goal setting all result in an unstable workforce.

The formation of a relationship with the community and an effective appreciation of Indigenous culture are essential for the delivery of health care. Time is an important factor in the acceptance of health care providers by the community. High staff turnover is a significant barrier to the delivery of health services in remote Indigenous communities. The recurrent training of new staff also depletes limited resources.



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Frequency of access to doctor

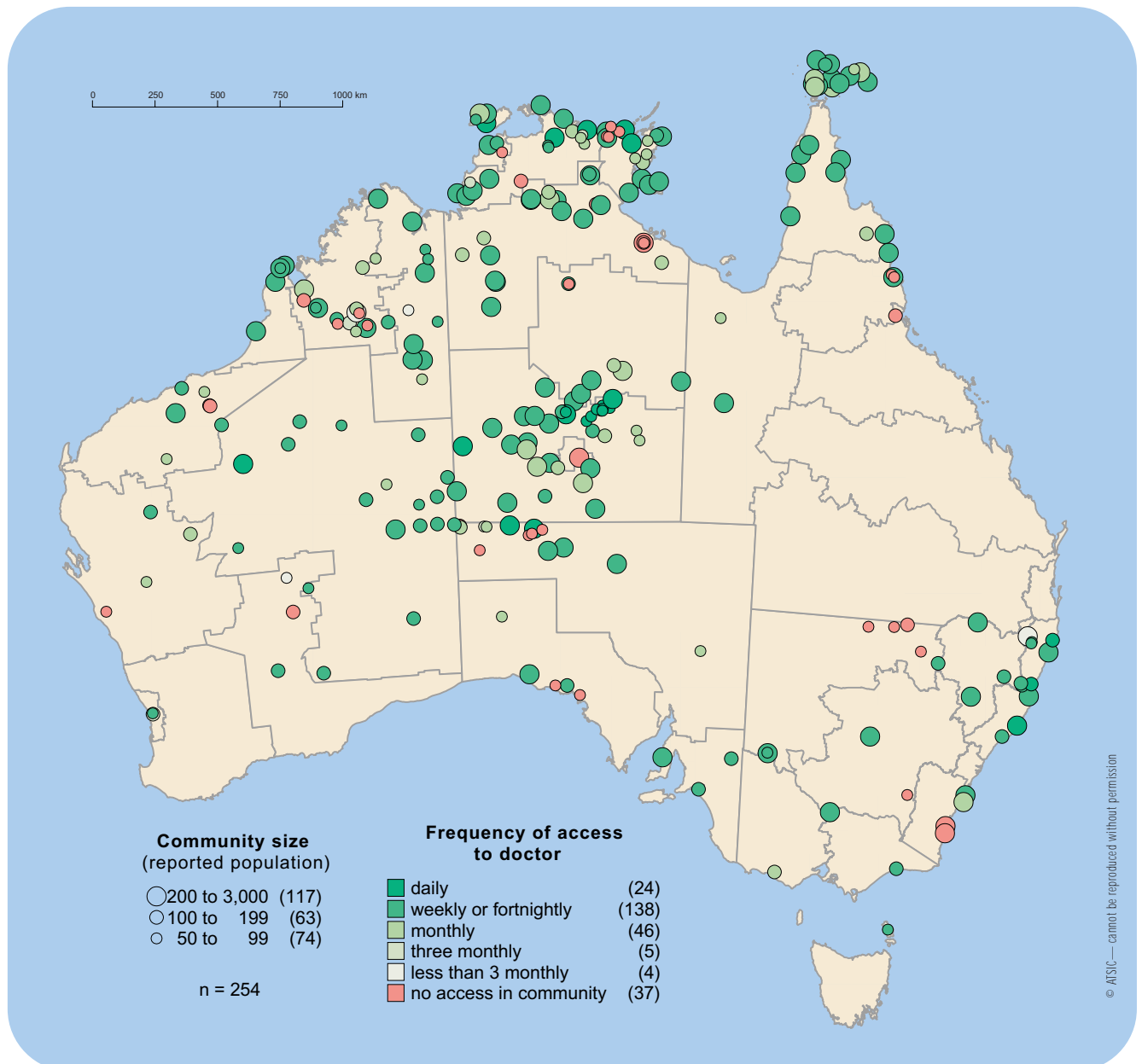
Map 29

While many primary health care services are provided effectively by nurses and health workers there is a need for some clients to be seen by a doctor. This may be for regular review of a chronic condition, for assessment, diagnosis and possible referral to specialist care, or to carry out minor procedures. Doctors contribute specific skills to the primary care team in community health centres. Recent policy and funding developments have resulted in an increase in the

number of doctors resident in remote Indigenous communities. Resident doctors are able to develop ongoing relationships with their clients and the community and gain an understanding of local circumstances impacting on the health of the people in the community. They are, therefore, better able to contribute to the personal care of people and to develop and contribute to community strategies to improve health. They are also more readily available to

attend to emergencies. However, many communities are too small to justify a resident doctor, and most are dependent on regular visits from a doctor based in a major centre apart from the community.

Map 29 reflects this reality, with few communities of 50 or more people having daily access to a doctor, and most having access on a weekly, fortnightly or monthly basis. A number of communities report no access to a doctor in the community.



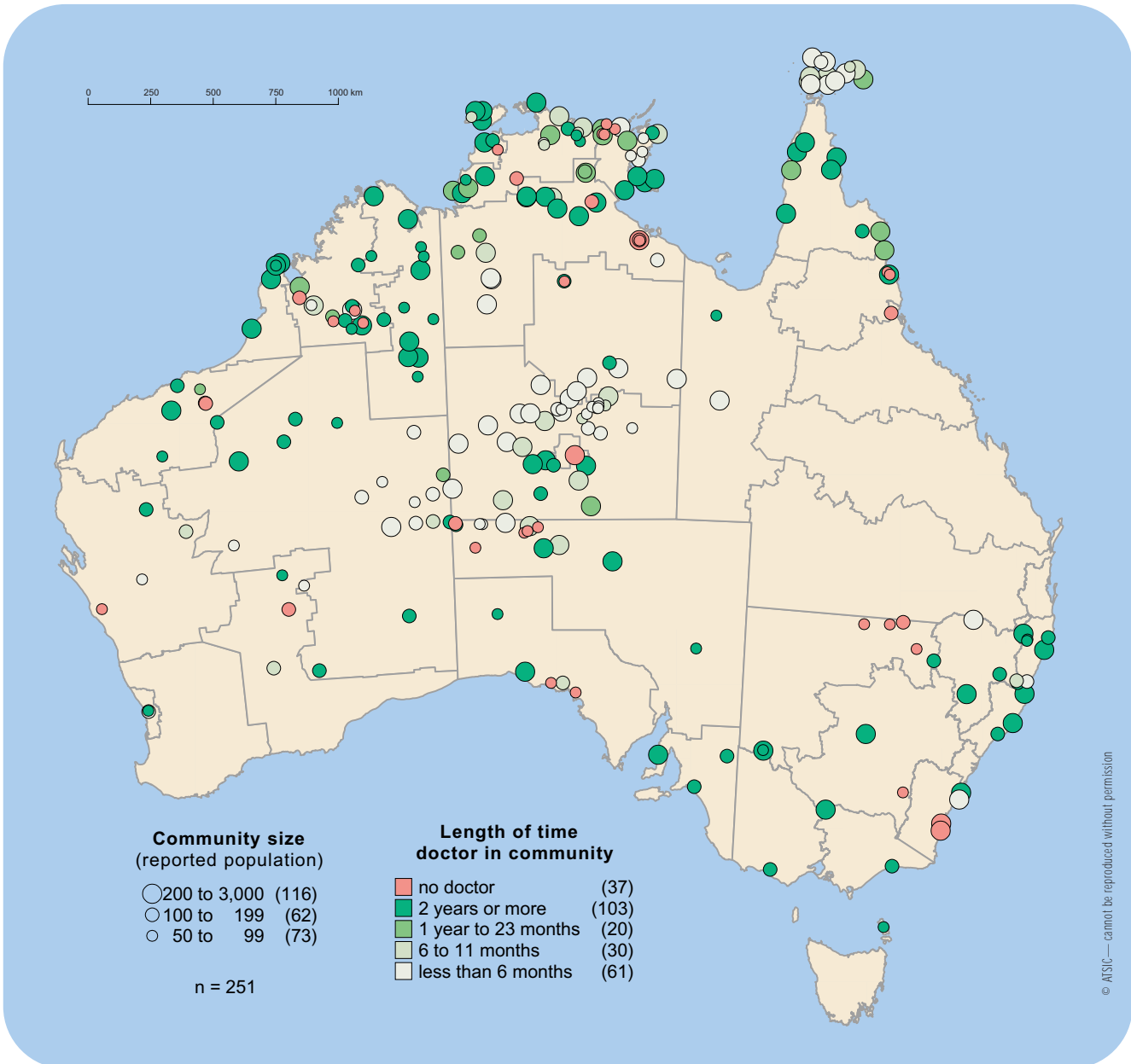
Map 30

Length of time doctor in community

Map 30 shows that for 61 communities the length of time the doctor had been in the community is less than six months and for a further 30 communities, six to 12 months. This tendency to high turnover or recent establishment of services by a doctor is particularly evident in Central Australia and the Torres Strait. While this may be an anomaly due to local circumstances in the period shortly before the survey, it reflects the same high

turnover as shown for nurses. This high turnover of health staff is particularly problematic because of the resources required for cultural awareness training, developing an understanding of the primary care setting, and the establishment of a support network. Continual allocation of funds to conduct the same training limits funds for other health care programs.

In 103 communities the doctor had been in attendance for over two years, in 20 communities for one to two years, in 30 communities for six months to one year, and in 61 communities for under six months.



Frequency of access to a dietitian

Map 31

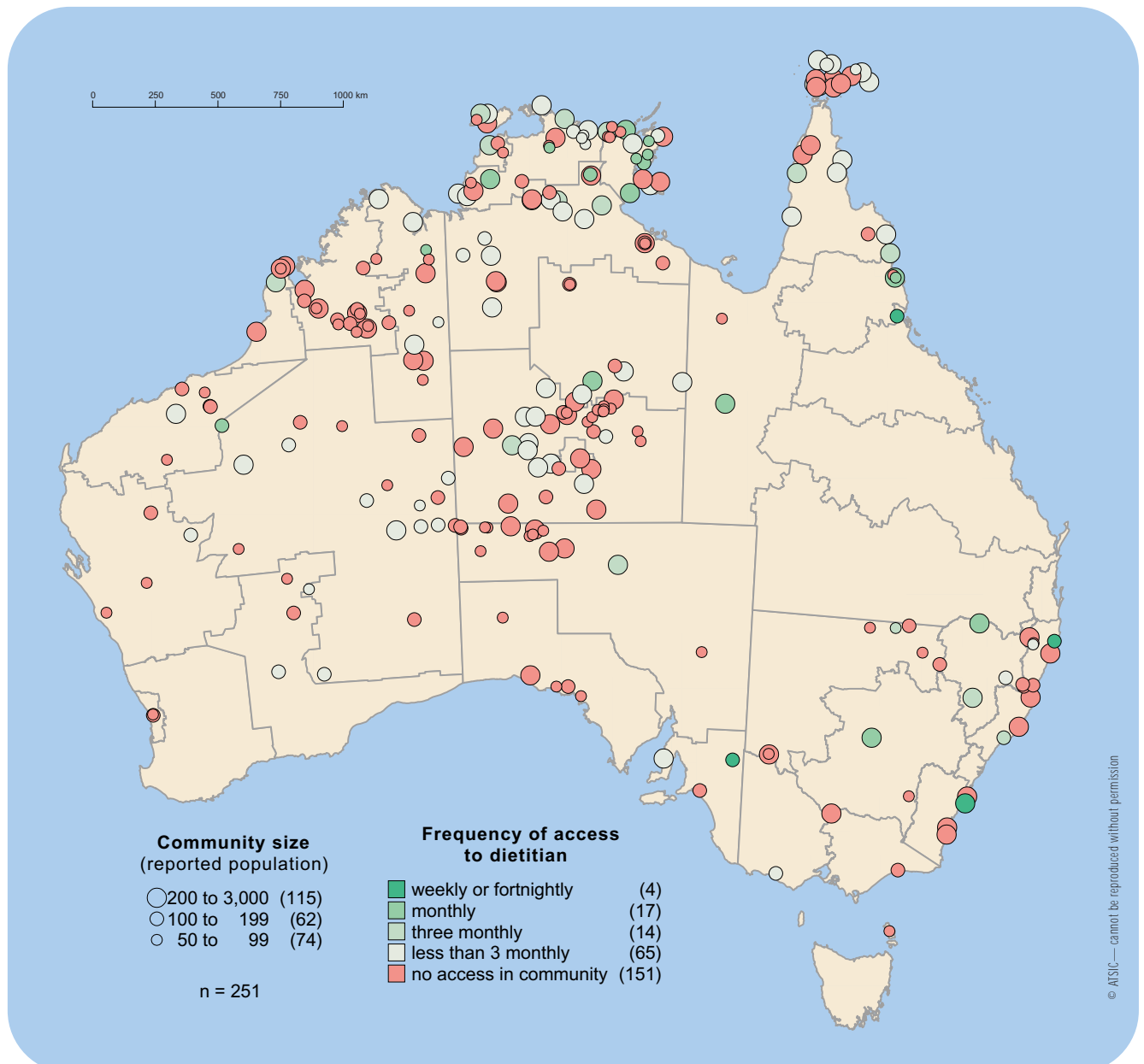
Nutrition has a significant influence on general health throughout the life cycle, and in particular on the occurrence of cardiovascular disease and diabetes. In children, rates of under-nutrition are high in rural and remote areas, while in urban areas rates of over-nutrition are relatively high. The prevalence of obesity is high in adults in many Indigenous communities. This reflects a vicious cycle of poor food supply and poor dietary habits. Good quality fresh

fruit and vegetables are generally in short supply and very expensive in remote communities.

Dietitians or nutritionists therefore have an important role to play in both adult and child health. They are involved in the provision of dietary advice and education on a community and individual level, as well as working with vulnerable groups, such as pregnant women, young mothers, and people with impaired glucose tolerance or

diabetes. They may also play a role in general community-level action to improve nutrition and food-supply quality through health promotion activities and working with store managers.

Map 31 shows that most communities, including larger communities, have no or minimal access to a dietitian. Communities in the Top End and New South Wales appear to be more likely to be visited by a dietitian than elsewhere.



Map 32

Frequency of access to a mental-health worker

Rates of mental illness in the Australian Indigenous population are higher than in the non-Indigenous population. In Indigenous communities, the stress associated with high levels of poverty, relative disadvantage, and few opportunities for advancement through employment is reflected in high levels of substance misuse, domestic violence and petty crime.

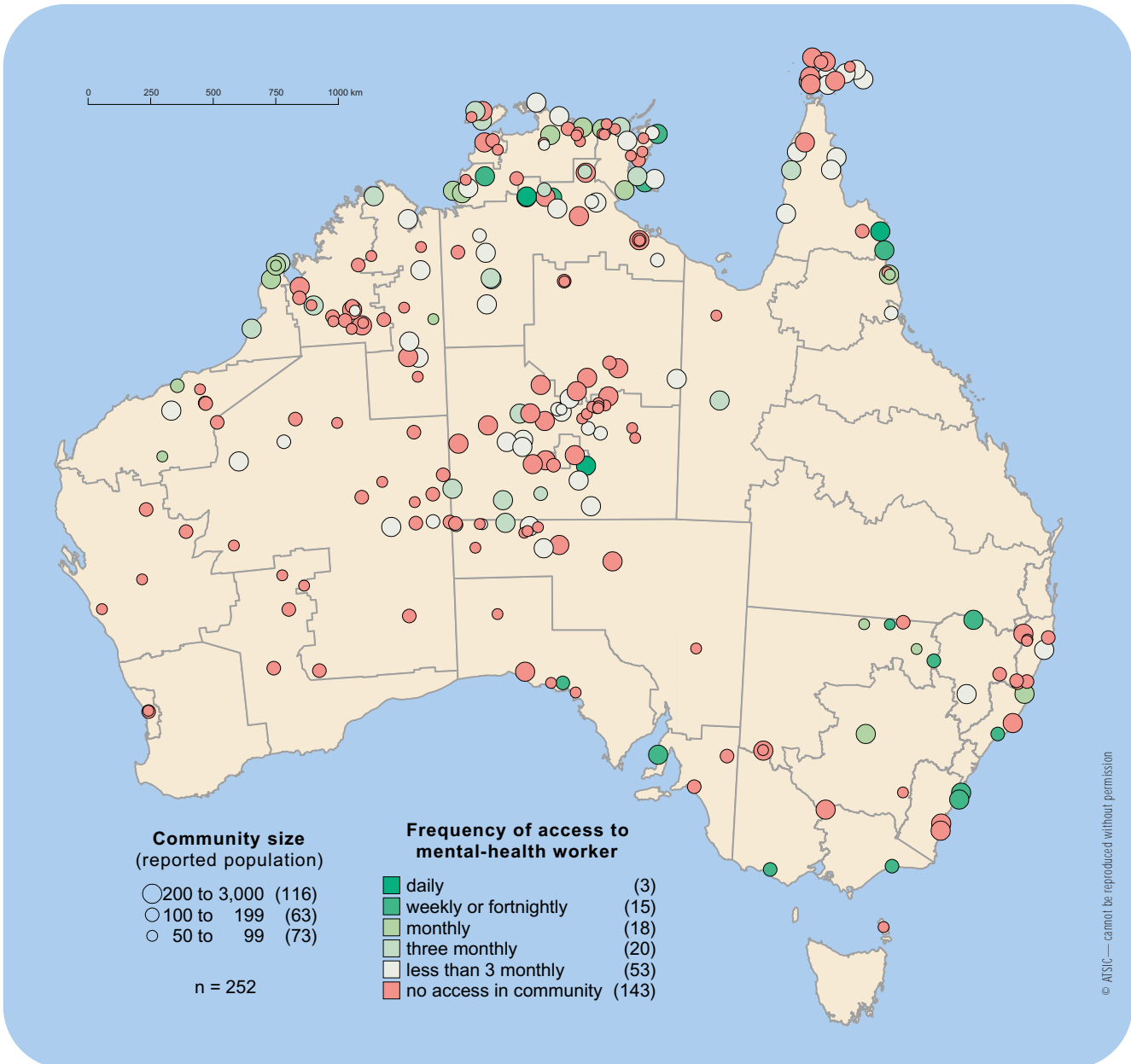
The ensuing community disruption breaks down the

traditional systems of welfare based on kinship and family ties. Individuals may no longer be protected from marginalisation and neglect. To some extent these forms of welfare may now be partially replaced or supplemented by non-family-based community health services.

The provision of culturally appropriate services to remote communities has been attempted through the training of Indigenous

mental health workers, the specialised training of existing health care providers, and outreach from urban areas where most of the mental health workforce is located. Strategies to provide emergency support for people with mental disorders in their own community have also been recommended.

Map 32 shows that most Indigenous communities have no or minimal access to a mental health worker.



Frequency of access to a drug and alcohol worker

Map 33

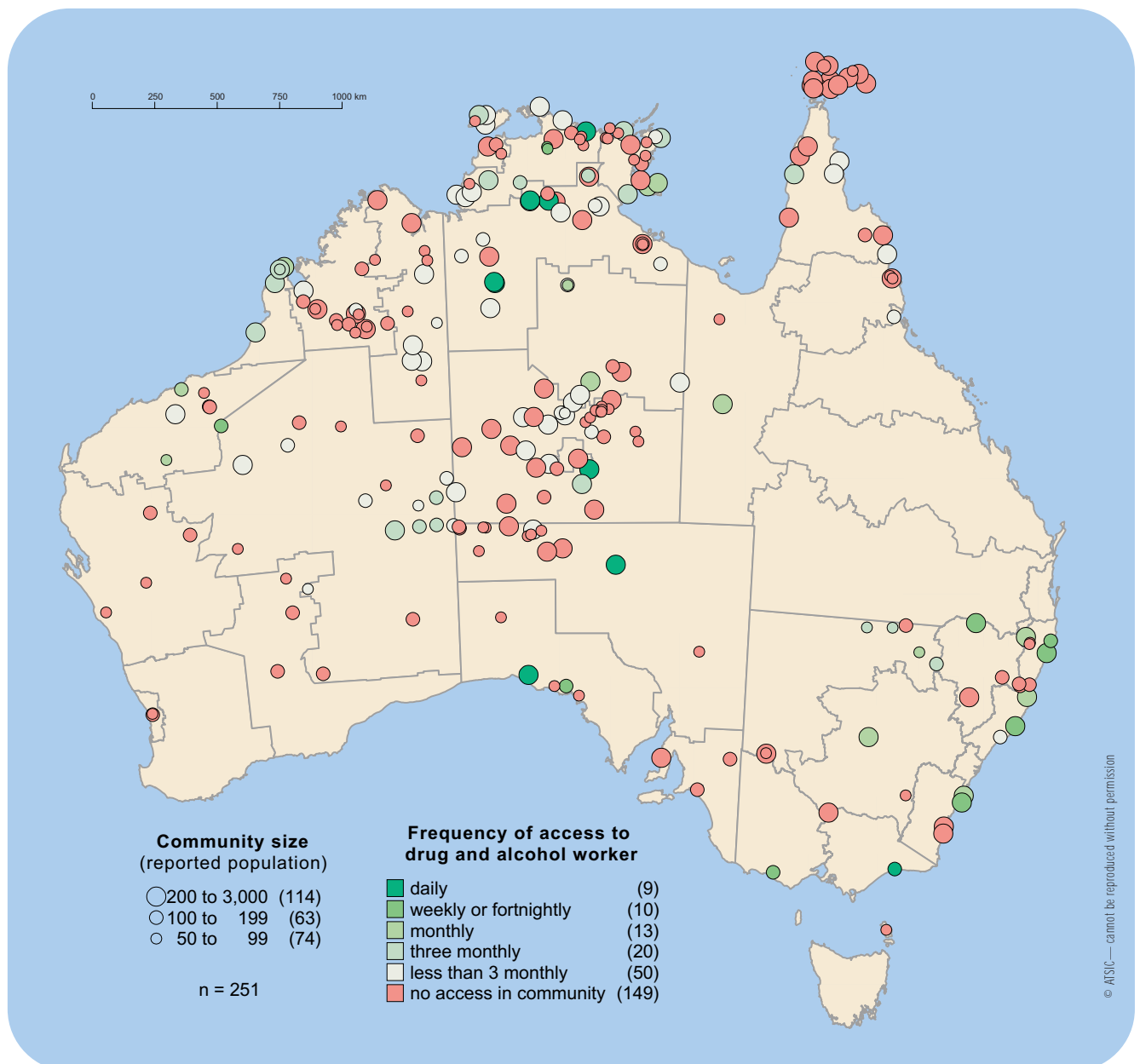
In addition to the impact on mental health, substance misuse impacts on physical health in a number of ways. Substance misuse is a major factor in physical trauma, motor vehicle injuries, and domestic and other interpersonal violence. The multi-system effects on the human body of excessive alcohol consumption and of tobacco smoking have been well described. The direct effects of other commonly misused substances such as cannabis and solvents are not as

well understood. However, the mind-altering effects of most of these substances are associated with an increased risk of self-inflicted or accidental injury, sedative effects predisposing to inhalation pneumonia and long-term brain damage.

As for many communities where socio-economic circumstances and environmental conditions are poor, substance misuse in Indigenous communities is a significant problem.

Drug and alcohol workers have an important role in community education about drug-related matters, community strategies for minimising harm and coping with the results of substance misuse.

Map 33 shows that most communities, including larger communities, have minimal or no access to a drug or alcohol worker.



Map 34

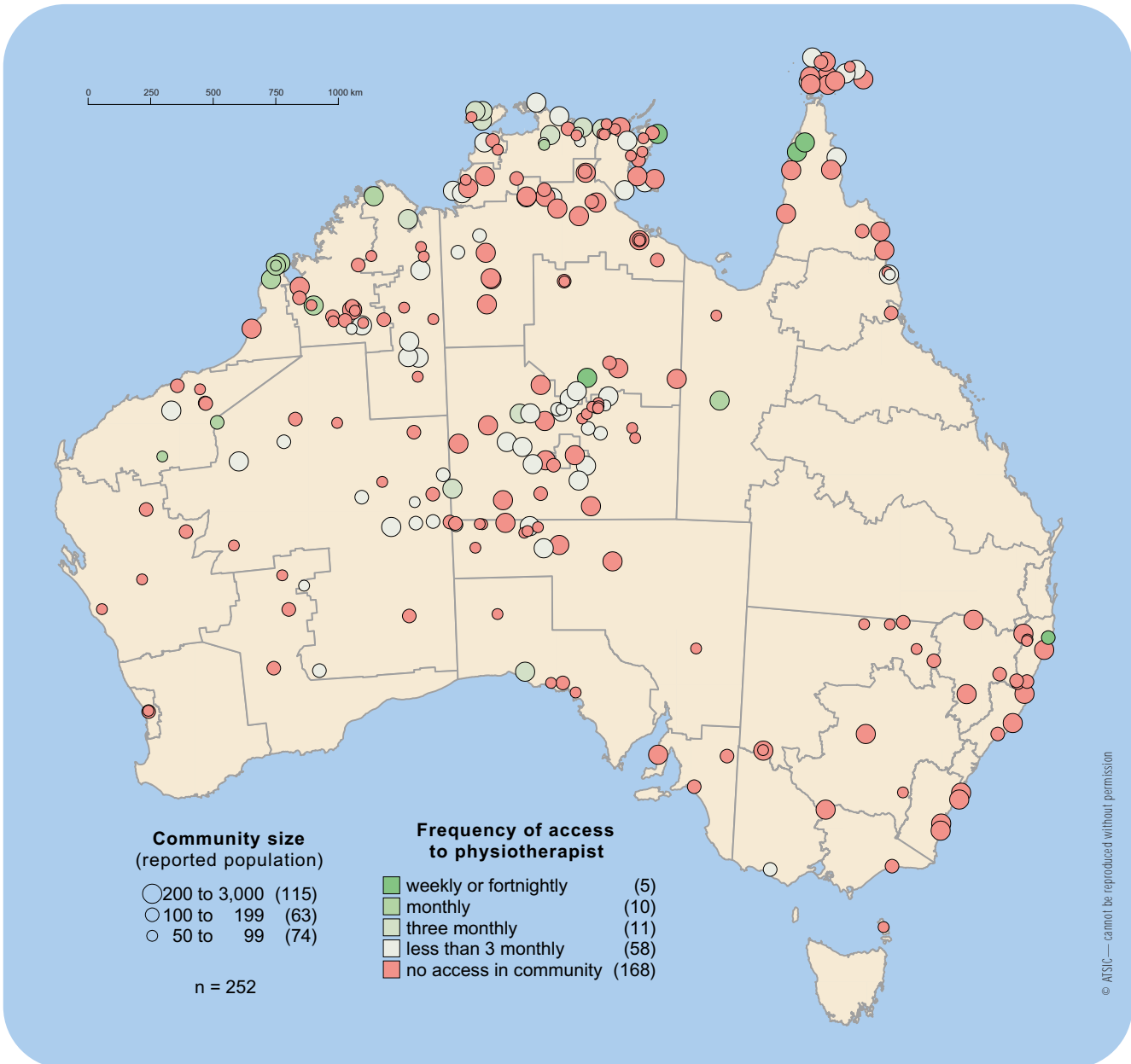
Frequency of access to a physiotherapist

Physiotherapists have a role in communities in the assessment and treatment of children and adults with physical disablement. Disabilities may be the result of abnormal fetal development or birth trauma, or the result of injury or illness. The widespread poor health status and limited access to health services of Indigenous people is associated with high rates of disability from congenital defects, injury and illness. Physiotherapy can reduce the

impact of physical impairment or handicap on the lives of these people. This may be through direct physical treatment, advocacy and through the provision of equipment. Physiotherapists have a role as part of multi-disciplinary teams of health professionals, and in supporting community-based staff through skills transfer and advice.

Map 34 shows that of all the allied health professionals covered in this atlas, access to physiotherapists

is the poorest. There are only a small number of communities scattered across Central Australia and Northern Australia, and one community in New South Wales, that report any access to a physiotherapist (84 communities in all). For 58 of these communities access is less than once every three months.



Frequency of access to a dentist

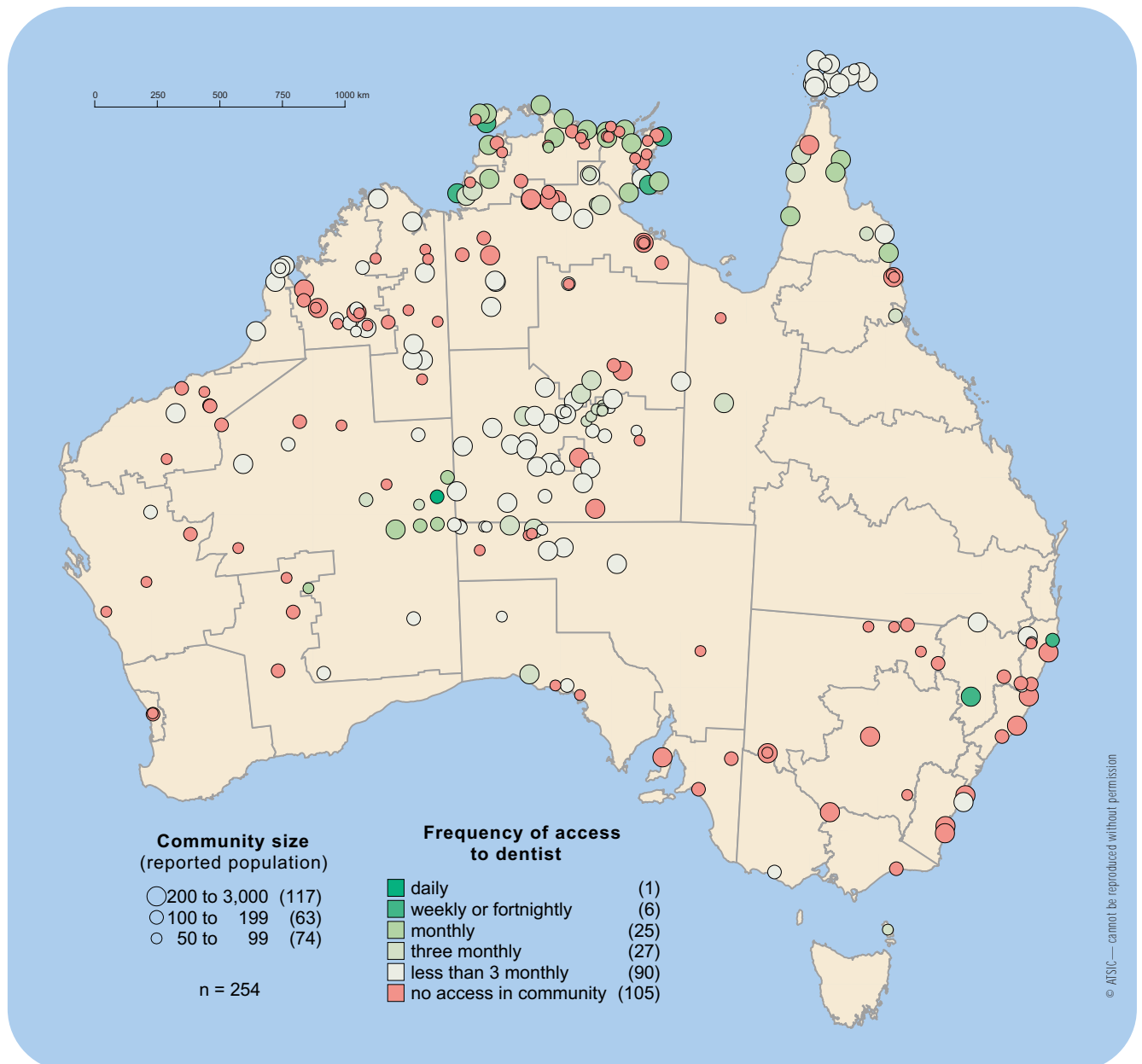
Map 35

In addition to pain, inconvenience and an impaired ability to chew and enjoy food, poor dental health can impact on general health. This may occur through chronic infection and through poor nutrition as a result of a limited consumption of food. The availability of regular preventive and therapeutic dental care is therefore important in the maintenance of good general health.

Map 35 shows that many communities have no access to a

dentist, or have access less than once every three months. While preventive care may be delivered on an episodic basis, the availability of therapeutic care on such an infrequent basis may be problematic.

Communities in the Top End, Cape York Peninsula and scattered communities in Central Australia appear better serviced than other areas.



Map 36

Frequency of access to an obstetrician or gynaecologist

Access to specialist medical services within communities is an important adjunct to the effective delivery of primary health care services. Such services may result in more effective consultations because of community support structures for clients and local knowledge of the clients' circumstances. Also, the specialist is better able to appreciate the client's home environment, and there is an opportunity for skills transfer between health professionals.

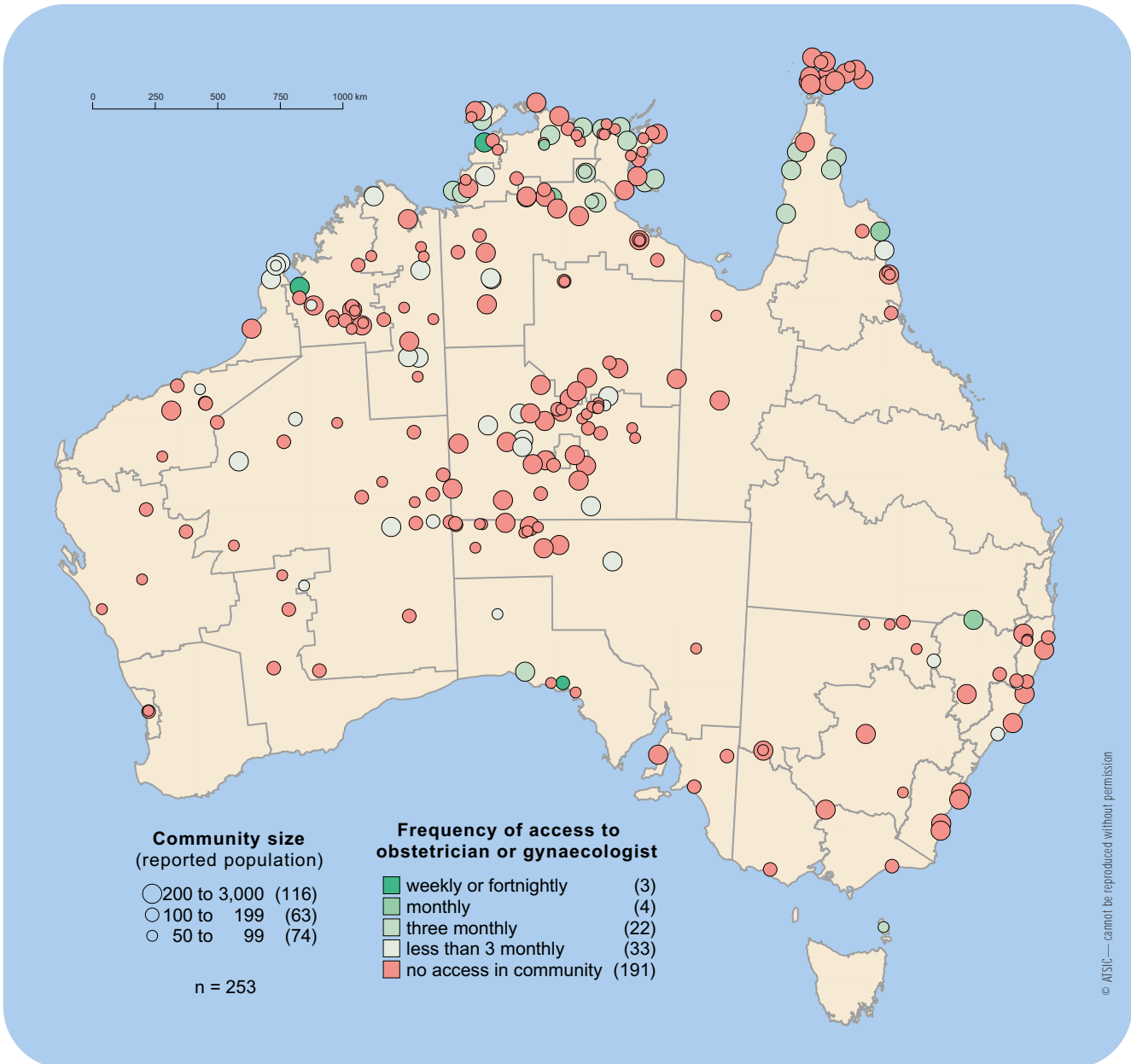
Specialist consultations in communities are potentially more cost-effective than consultations at distant major centres.

The high burden of disease in many communities and the relatively poor access to primary health care services mean that large numbers of people develop advanced disease or complications that require specialist care.

Maps 36, 37, and 38 show the frequency of access to an

obstetrician or gynaecologist (O&G), an ear, nose and throat or respiratory (ENT) specialist, and an eye specialist. For all categories of specialist, most communities have no access.

Communities in the Top End have relatively better access to O&G specialist care than elsewhere, probably reflecting the presence of a dedicated specialist outreach service with a strong emphasis on O&G in this area. Communities on Cape York



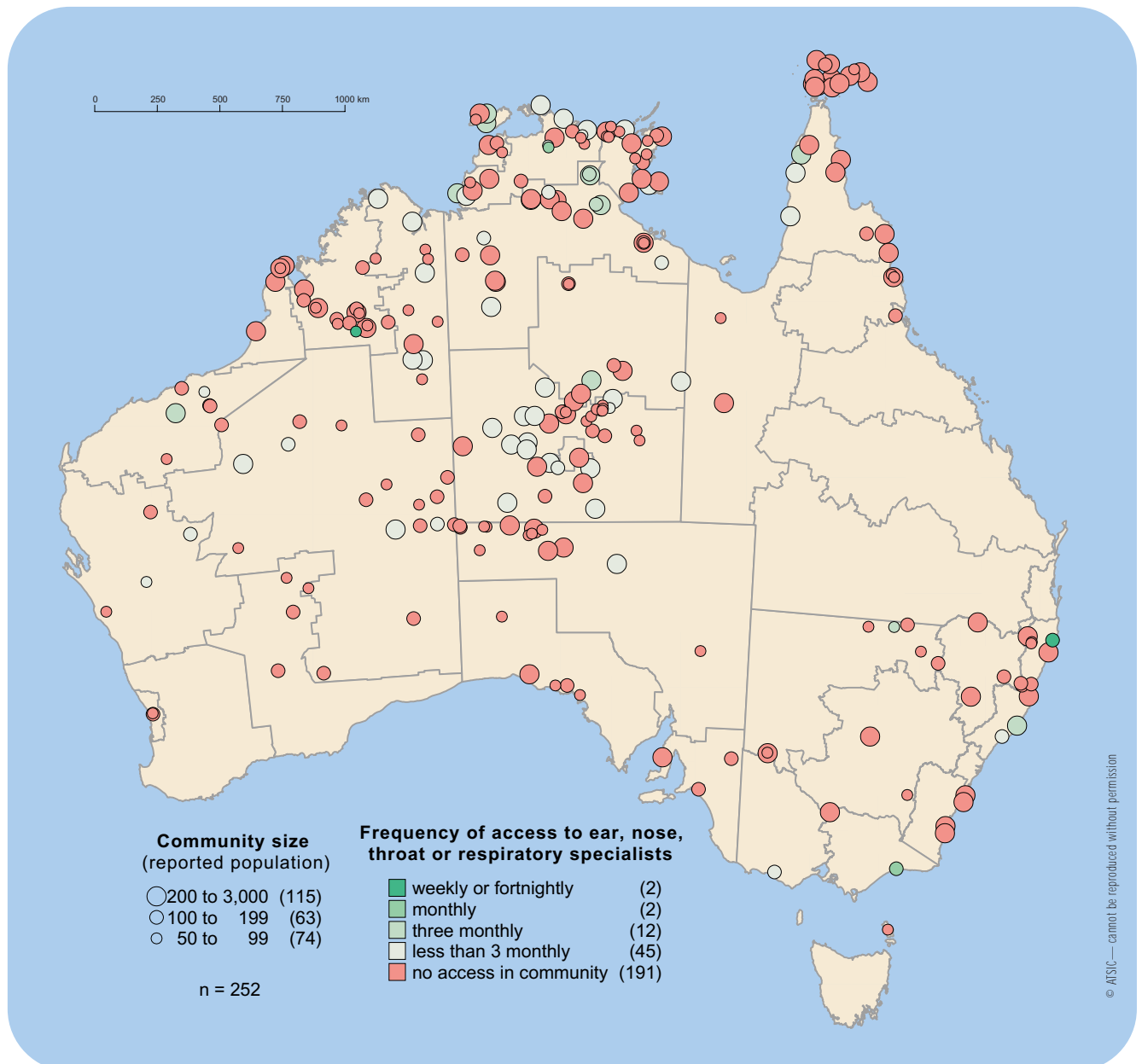
Frequency of access to an ENT specialist

Map 37

Peninsula also appear relatively well serviced. In other areas some access to O&G specialist care is reported for a number of communities, and these are mostly scattered across Northern and Central Australia. This is the pattern for reported access to ENT specialist services as well, although relatively more communities report some access than for O&G services.

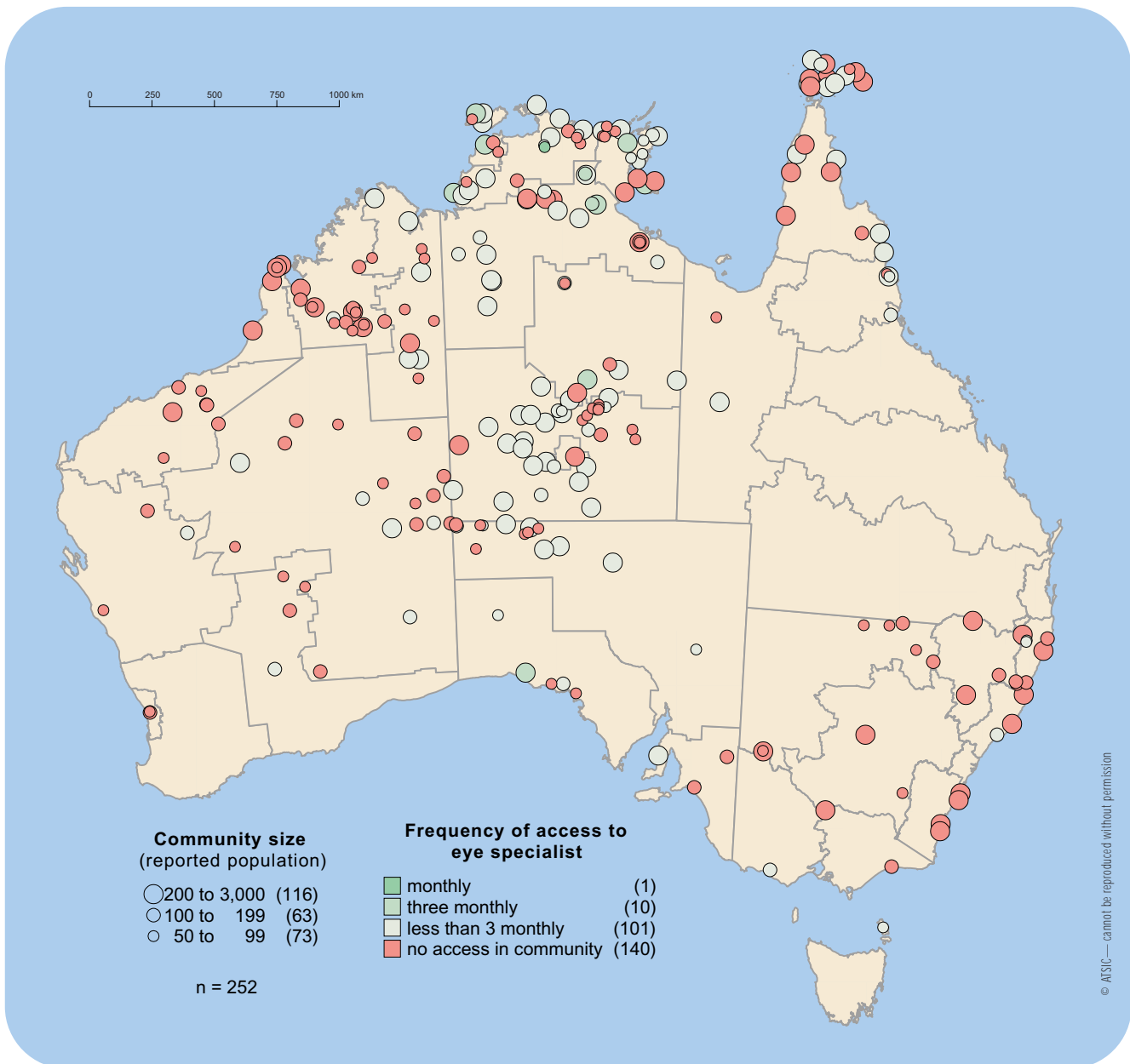
Many communities in Central and Northern Australia report some access to an eye specialist, probably

reflecting the activities of a mobile eye care unit in that area.



Map 38

Frequency of access to an eye specialist



EXPLANATORY NOTES

Introduction

The 1999 Community Housing and Infrastructure Needs Survey (CHINS) was conducted throughout Australia from 2 August to 31 October 1999. The Australian Bureau of Statistics (ABS) conducted the CHINS on behalf of, and with funding from, the Aboriginal and Torres Strait Islander Commission (ATSIC). The survey was conducted under the authority of the *Aboriginal and Torres Strait Islander Commission Act 1989*.

The survey aimed to provide information which could be used to:

- identify and assess community and housing-related infrastructure in discrete Aboriginal and Torres Strait Islander communities, and to make basic assessments of other Aboriginal and Torres Strait Islander community housing
- contribute to the process of planning future development in Aboriginal and Torres Strait Islander communities
- provide a basis for evaluating future need in Aboriginal and Torres Strait Islander communities

- facilitate the development of databases on discrete Aboriginal and Torres Strait Islander communities and other Aboriginal and Torres Strait Islander community housing in each State and Territory

The survey collected information from:

- Indigenous housing organisations, including the number and condition of their housing stock, the number of bedrooms, amount of rent collected and expenditure on repairs and maintenance
- discrete Indigenous communities, including housing and related infrastructure, such as water and power supply, sewerage systems, drainage and roads; access to health, education and other services were also included

Scope and coverage

Although called a survey, the CHINS was a complete enumeration of all Indigenous housing organisations and discrete Indigenous communities. This included organisations and communities located in urban and sparsely settled

areas in all States and Territories.

In cases where a small housing organisation had dwellings managed by a larger Indigenous housing organisation, such as a resource agency, information was collected from the larger organisation. The

smaller organisation was then considered to be out of scope, with the relevant dwellings included in the counts for larger housing organisations.

Survey frame

The survey frame, specifically developed for the CHINS, is comprised of two related lists:

1. Indigenous housing organisations
2. Discrete Indigenous communities

To contact and interview all Indigenous housing organisations and discrete Indigenous communities, the ABS first had to develop a comprehensive list of relevant housing organisations and discrete communities. Substantial effort was made to ensure complete coverage of both types of entities.

Indigenous housing organisations

The ABS utilised a list of Indigenous housing organisations compiled by the Community Housing Federation of Australia (CHFA) under contract to the Department of Family and Community Services. This list was prepared from administrative data held by ATSIC and State and Territory housing authority records.

Due to inadequacies in the administrative data used to compile this initial list, ABS assisted the CHFA to undertake further checks against other data sources to ensure that, as far as possible, new housing

organisations were included, and organisations that no longer operated or were out of scope were removed. Sources for this validation included ATSIC regional offices, the regional offices of various State and Territory agencies involved in the provision of services to Indigenous communities and the Registrar of Aboriginal Corporations.

The list of housing organisations was further updated during the CHINS enumeration with the use of local knowledge. As part of the CHINS interview, organisations were requested to provide the names of any new or other Indigenous housing organisations that owned or managed housing stock in the local area. All organisations identified in this process were followed up and included in the survey if found to be in scope. Organisations which did not manage housing for Aboriginal or Torres Strait Islander people or which were in liquidation or receivership were considered out of scope.

Discrete Indigenous communities

The initial list of discrete Indigenous communities was compiled from a variety of sources, such as government and private mapping agencies, State and Territory agencies involved in the delivery of

services to Indigenous communities, and records from the 1996 Census of Population and Housing.

In some cases, a number of agencies within the same State or Territory provided different community lists for their jurisdiction. To assist in resolving these cases, location information such as latitude and longitude were used to compare the different sources and to remove duplicate records generated through the widespread use of alternative names and spellings. The initial list was also validated against information on the location of housing stock owned or managed by Indigenous housing organisations. ABS then allocated a unique national identifier to each community to enable consistent referencing.

The list of discrete communities was further updated during the CHINS enumeration with the use of local knowledge. As part of the CHINS interview, respondents were requested to provide the names of communities in the area which were not identified on the ABS list. All communities identified in this process were included in the survey if found to be in scope. Communities found to be unoccupied and which were not expected to be reoccupied in the next 12 months were considered out of scope.

Data collection method

Data for the survey was collected through personal interviews with key members of Indigenous housing organisations and communities who were knowledgeable about housing and infrastructure issues. Such people included community council chairpersons, administrators, coordinators, clerks, housing officers,

water and essential service officers. Information regarding health services was generally collected from health clinic administrators.

The interviews were conducted by trained interviewers, some of whom had worked on previous ABS surveys, while others were specially recruited for the CHINS. All interviewers were

required to demonstrate a knowledge of Aboriginal and Torres Strait Islander societies and cultures and an ability to communicate effectively with Aboriginal and Torres Strait Islander organisations and people. Extensive training was provided to interviewers in both classroom and on-the-job situations.

Data quality

The CHINS was the first survey the ABS has undertaken through personal interview with key members of Indigenous communities and housing organisations. Extensive testing and validation was undertaken to confirm the suitability of this survey methodology.

Three trial surveys were conducted from September to November 1998 to determine the ability and willingness of respondents to provide the information sought, and to evaluate the questionnaires, documentation and field procedures developed for the CHINS. A dress rehearsal, or final test run for the survey, was conducted in March 1999.

During this testing program, 158 discrete Indigenous communities and 60 Indigenous housing organisations with housing outside of communities were enumerated. Large and small communities and organisations, in both urban and sparsely settled areas, were selected in each of the tests to ensure that the questions, documentation and field procedures were suitable in all situations.

Information collected during testing was validated against other sources such as community development plans, assessments undertaken under the National Aboriginal Health Strategy, and

housing organisation annual reports. Other data was collected from sources such as the 1997 Western Australia Environmental Health Survey, the 1998 New South Wales Water and Sewerage Survey, the 1994 National Aboriginal and Torres Strait Islander Survey, and the 1996 Census of Population and Housing. As a result of this comparison with other sources, some data items were considered not to be of an acceptable standard and were excluded from the final survey.

Data collected in the final survey was also validated through comparison with other data sources at both the aggregate and individual community and organisation levels. Comparisons were made with data collected during the dress rehearsal to provide an indication of the consistency of responses. Preliminary survey results were also returned to communities and organisations for their use and verification, and any substantial variations were resolved. In addition, field staff indicated where respondents had difficulty providing accurate information.

Results from this validation process have indicated that aggregate data, as presented in this publication, is considered to be fit for the purpose intended. For a number of housing organisations and

communities, however, some items were found to be associated with substantial reporting error due to, for example, inadequate knowledge of the respondent of the subject matter, the extent of the detail required, and unavailable financial documents. Therefore, reliance should not be placed on the fine detail of geographic data, or on the individual organisation or community level information of the following items:

Housing organisation items

- total dwellings owned or managed
- condition of dwellings
- total rent collected
- total maintenance expenditure
- number of dwellings maintained
- number of bedrooms

Community items

- population
- total dwellings owned or managed
- condition of dwellings
- grey-water disposal
- incidence of ponding

Mapping

The maps of Australia are presented on the Australian Simple Conic projection. ATSIC region boundaries and Regional Council names are current as of April 2001.

For any single map, communities with a reported population equal to 0, as well as those communities which recorded 'not stated', 'not applicable' or 'not collected' responses, have been excluded. In some cases, map data has been streamlined in an effort to highlight a point related to a particular variable. Readers requiring detailed information about data collected should request a copy of the *Community Housing and Infrastructure Needs Survey, Australia, 1999: Data Dictionary* from ATSIC (details, p. 67).

Discrete communities included in the CHINS have been categorised based on their reported population. Four classes have been used: less than 50, 50 to 99, 100 to 199 and 200 to 3000. Communities are shown with four sizes of dots corresponding to each class and the maps show the bi-variate nature of data being presented (i.e. population size and the particular variable under discussion). The number in brackets after each population class refers to the number of communities in that specific class.

Colours for variables have been

selected based on their ability to provide an effective visual contrast for the data being represented. On some maps shades of green are used to represent the quantitative, or ordinal, differences between categories (e.g. varying distances to services) while in other maps different colours are used to signify qualitative, or nominal, differences (e.g. different types of sewerage systems). Again, the number in brackets after each category refers to the number of communities in that specific category.

A major presentation issue of many of the maps in this atlas relates to the overlap of community dots. This is particularly so in areas where a large number of communities are located near one another, such as in and around Alice Springs. The end result is that some community data may be obscured or not clearly visible on paper and while this is regrettable, it is unavoidable.

While every effort has been made to present an accurate picture of the data by way of each map, the accuracy of the location of some communities cannot be guaranteed. The existence of a complete and accurate Indigenous community geodatabase is not available at this time and, therefore, some communities may not be mapped in their correct location. It is hoped that these geo-

referencing concerns will be addressed with the increasing use of Geographic Information System (GIS) software in a variety of organisations requiring accurate Indigenous community data.

Software used in the initial data analysis and subsequent mapping of this atlas project included Microsoft Access, Microsoft Excel and MapInfo Professional. The maps were output as Portable Document Format (PDF) for importing into the desktop publishing software. Please contact ATSIC for details on how to obtain individual copies of the maps as PDF files.

Specific items from the CHINS were included in this atlas on the basis of their significance to the health of the populations of specific communities. The general areas covered are:

- Housing
- Water supply
- Sewerage
- Waste
- Power
- Communications
- Roads and air access
- Educational facilities
- Health facilities and personnel

Related surveys

ATSIC commissioned a similar survey: the Housing and Community Infrastructure Needs Survey (HCINS), in 1992. Apart from the CHINS, the HCINS is the most recent national survey which collected information on housing and infrastructure in Aboriginal and Torres Strait Islander communities. The HCINS did not include Indigenous housing

organisations unless their stock was located within discrete Indigenous communities. Due to differing methodologies and definitions, comparisons between the 1992 and 1999 surveys should be treated with caution and are not a part of this report.

A number of collections have also been undertaken on a State or

Territory basis which have collected information on housing and/or infrastructure in discrete Indigenous communities, for example, the 1998 New South Wales Water and Sewerage Survey and the 1997 Western Australian Environmental Health Needs Survey. Similar surveys have also been conducted on a regional basis from time to time.

Other products available from CHINS

The CHINS was conducted on behalf of, and with funding from, the Aboriginal and Torres Strait Islander Commission. The ABS has entered into an agreement with ATSIC to manage the CHINS dataset and provide access to aggregate information. In addition to this publication, the following products and services are available from the ABS:

- *Community Housing and Infrastructure Needs Survey, Australia 1999: Data Dictionary* (produced by ABS, published by ATSIC 2000): The CHINS data dictionary includes a complete listing of the data available from the CHINS, as well as definitions and the questionnaires used to collect the information.

- *Housing and Infrastructure in Aboriginal and Torres Strait Islander Communities, Australia* (ABS catalogue No. 4710.0, 1999)

- *Special tabulations*: Subject to confidentiality constraints, the ABS can provide tabulations from the survey incorporating data items, populations and geographic areas selected to meet individual requirements. These can be provided in printed or electronic form. A charge will be made for any tabulations of this kind in accordance with ABS pricing policy at the time.

For more information on these products and services as well as a wide range of other publications and data related to Aboriginal and Torres Strait Islander peoples, contact the National Centre for Aboriginal and Torres Strait Islander Statistics, Australian Bureau of Statistics, phone 1800 633 216.

For users who wish to undertake more detailed analysis of the CHINS data, a unit record file (URF) has been prepared for ATSIC. Requests for a CHINS URF should be directed to the National Housing and Infrastructure Centre, Aboriginal and Torres Strait Islander Commission, phone (03) 8619 8000.

CHINS 2001

With an aim to update the CHINS data collected from the 1999 survey, the ABS conducted another survey from March to June 2001. This latest survey will assist government agencies with policy decisions,

program development and targeting of funding and resources to Indigenous communities. Results from CHINS 2001 will enable progress to be measured from 1999 and will help identify those areas of greatest need.

For more information about CHINS 2001 contact the National Housing and Infrastructure Centre, Aboriginal and Torres Strait Islander Commission, phone (03) 8619 8000.

Glossary

Community health centre

A facility that provides a range of medical and health-related services to the community. The centre may also be active in preventive medicine and provide advice to people on issues such as sexually transmitted diseases, immunisation and family planning. Not all of these services may be available in remote areas, but centres generally have nurses, health workers and doctors in regular attendance.

Community-owned or managed dwellings

Permanent dwellings located in discrete communities which are either owned or managed by an Indigenous housing organisation. Management includes at least one of the following functions: tenancy arrangements, rent collection and housing maintenance. Included are permanent dwellings owned by State or Territory housing authorities but managed by an Indigenous organisation. Also included are a small number of community dwellings where no housing organisation was identified.

Discrete Indigenous community

A geographic location bounded by physical or cadastral (legal) boundaries and inhabited, or intended to be inhabited, predominantly by Indigenous people, and with housing or infrastructure that is either owned or managed on a community basis. It is recognised that, in some cases, there is a degree of subjectivity in deciding whether a particular location meets the definition of a discrete Indigenous community. In cases of doubt, locations were included as discrete communities. Locations were not included as communities if they

had no usual population at the time of the survey, and were not expected to be reoccupied within the next 12 months.

Dwelling condition

The condition of permanent dwellings owned or managed by an Indigenous housing organisation at the time of enumeration. The condition of permanent dwellings has been categorised according to the extent of repairs required in the following way:

- minor or no repair: defined as repairs of less than \$20,000 in low-cost areas; \$27,000 in medium-cost areas; and \$33,000 in high-cost areas
- major repairs: defined as repairs of \$20,000 to less than \$60,000 in low-cost areas; \$27,000 to less than \$80,000 in medium-cost areas; and \$33,000 to less than \$100,000 in high-cost areas
- replacement: defined as repairs of \$60,000 or more in low-cost areas; \$80,000 or more in medium-cost areas; and \$100,000 or more in high-cost areas

Low, medium and high-cost areas were defined according to ATSIIC region or the Torres Strait area, based on relative building costs provided in *Rawlinson's Australian Construction Handbook, 1999* (Rawlhouse Publishing, 1999, Perth).

Dwellings affected by flooding

Permanent dwellings where water damage has occurred to living areas, such as the lounge room, dining room, kitchen, bedrooms or hallways. It excludes dwellings where water damage is confined to garage or

storage areas.

Dwellings affected by overflows or leakages

Permanent dwellings where sewage overflows or leakages have occurred either inside the dwelling or nearby, such as in the yard.

Electricity supply

The type of electricity supply used by the community for servicing community dwellings and facilities. This includes:

- State grid
- large community generators
- small domestic generators (usually providing power for one or two dwellings)
- solar
- solar hybrid

Flooding

Instances where watercourses overflow and inundate either part or all of a community. It includes the overflow of natural swamps, lagoons or creeks which then discharge water through residential, administration or recreational areas of the community.

Health promotion program

A series of group activities conducted by a health professional within the community. They are designed to promote primary or secondary health through education, mass screening or immunisation. A program covers:

- screening in early detection and intervention
- a display of promotional and educational material with distribution of fliers
- a referral process for patients

Hospital

A building in which doctors or nurses provide medical assistance and people can be admitted to stay overnight if necessary. A hospital does not need to have surgical facilities to be included.

Permanent dwellings

Buildings designed for people to live in, with fixed walls, roof and doors. They usually have kitchen and bathroom facilities, or provision for these to be built into the dwelling at a later date. These dwellings are made from regular building materials and are intended for long-term residential use. Dwellings were not considered as permanent unless they had internal walls dividing the living space into separate rooms.

Ponding

Pools of still water that remain stagnant for a period of one week or more and cover an area of at least 10 sq m. The pool of stagnant water must occur within the boundary of the discrete Indigenous community. Naturally occurring swamps or lagoons are not considered ponding.

Power interruptions

Disruptions to the electricity supply for a period of one hour or more.

Reported usual population

The number of people residing in a discrete Indigenous community whose only or main residence is that community. In this context 'residence' means the community in which a person resides or intends to reside for at least six months. This includes non-Indigenous residents who meet the above criteria.

Road inaccessibility

The extent to which road access into or out of a community has been cut for a period of one or more days in

the 12 months prior to the survey.

Road access can be cut due to naturally occurring events — such as floods or bushfires — that prevent the usual community population from accessing major shopping and banking services in the nearest town.

Rubbish collection

An organised program for the collection and removal of rubbish by an agency rather than individual householders. It includes services which collect household rubbish from each dwelling or a group of dwellings on a regular basis.

Sewerage system

A water-based or dry system used for the disposal of human waste. This includes:

- water-borne systems
- septic tanks with common effluent disposal
- septic tanks with leach drain
- pit toilets
- pan toilets
- other sewage disposal systems

A main sewerage system refers to the sewerage system that services the greatest number of dwellings in a community.

Temporary dwellings

A structure used as a place of residence which does not meet the building requirements of a permanent dwelling (see Permanent dwellings above). Types of structures included as temporary dwellings are:

- caravans
- tin sheds without internal dividing walls
- humpies
- dongas
- other makeshift shelters

Water source

An organised supply or source of water that is used to supply the community with water for drinking purposes. This includes:

- town-supplied water
- bore water
- rainwater tank
- catchment reservoir, river water, lagoon, dam or weir
- soak, well or spring
- other organised supply

Water restrictions

One or a combination of the following types of restrictions:

- amount of water used
- purpose for which water can be used
- method of water usage (e.g. fixed sprinklers)
- specified times when water can be used

Water treatment

Treatments undertaken to the community water supply to improve water quality. This includes treatments such as:

- chlorination
- disinfectant
- direct filtration
- sedimentation/filtration
- aeration
- activated carbon



Cover painting 'A Brighter Future' by Katrina Clark



ATSIC

The Aboriginal and Torres Strait Islander Commission
National Housing and Infrastructure Centre
Level 13
50 Queen Street
Melbourne Vic 3000

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