



Government of **Western Australia**  
Department of Training  
and Workforce Development

# STATE PRIORITY OCCUPATION LIST

Review and  
changes to  
methodology

August 2019



Building the workforce to meet the economic and community needs of Western Australia

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This paper is produced by the State Workforce Planning branch of Western Australia’s Department of Training and Workforce Development.

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## Introduction

This information paper details the changes stemming from the review of the *State priority occupation list* (SPOL) methodology conducted throughout 2017 and 2018, and the resulting changes to the quantitative data treatment and the collection of qualitative industry commentary from the training council network. For further details on the SPOL2019, please see the *State priority occupation list: Summary* paper and the *State priority occupation list: Scope methodology and sources* paper.

Both papers, plus detailed occupational profiles for the 799 SPOL eligible occupations are available from the Department of Training and Workforce Development's website at [dtwd.wa.gov.au/workforce-development](http://dtwd.wa.gov.au/workforce-development).

## Background – Why review the SPOL?

The essential purpose of the SPOL – to inform and guide workforce planning and development in Western Australia – has not changed since it was first designed in 2009–10. However, the methodology for developing the SPOL has been reviewed every year by the Department of Training and Workforce Development (the Department).

The focus of these reviews has been to ensure the methodology:

- uses the latest and most relevant data and analytical techniques;
- properly incorporates the views of stakeholders; and
- creates outputs that genuinely reflect the circumstances of the broader State economy.

Conducting this process on a regular basis helped to ensure the SPOL has remained robust and fit for its specific purpose over a significant period of time. The growing impact upon SPOL of a number of other factors also meant it was timely to conduct a more thorough review of the methodology. These are briefly described as follows.

### **The moderation of the Western Australian economy**

The SPOL methodology was originally designed during 2009–10, a period of high demand for labour – the 'mining boom Mk II'. The focus at that time was very much on skills and labour shortages, crowding out and the prioritisation of training and migration solutions to the areas of most urgent need.

Since that time, and particularly since around 2013, the State's economy and labour market have moderated considerably. Unemployment and underemployment are higher, and there are very few occupations experiencing unmet demand. It had become increasingly apparent that the previous focus on shortages was too narrow, and that the SPOL methodology should be more flexible to allow for a range of economic conditions.

### **The limitations of labour market data**

The *Australian and New Zealand Standard Classification of Occupations* (ANZSCO) has not gone through a major review since 2006<sup>1</sup>. The Department has long been in dialogue with the Australian Bureau of Statistics (ABS) over the need for a major review, given the dynamic and changing nature of jobs and the labour market.

In lieu of such a review, the question of how best the SPOL should deal with relatively new occupations (such as integrated ratings, aerodrome reporting officers and drone operators) or increasing specialisations within occupations (such as with dental specialists) required a thorough examination.

### **The availability of improved technology**

Implementation of an improved information and communications technology (ICT) solution has allowed for greater integration with a number of corporate datasets, as well as created the opportunity to track occupations at a much more granular level.

It was considered timely, given all the other circumstances outlined in this paper, that options for using these improved systems to further improve the SPOL methodology should also be considered.

### **Critical occupations and skill versus employment level**

A major statistical issue exists when attempting to prioritise different occupations across the ANZSCO scale – namely how to compare the requirements of occupations at different levels of skill and with different prerequisites in terms of qualifications and experience.

The original methodology dealt with this in three separate ways<sup>2</sup>:

- the identification of ‘critical’ occupations<sup>3</sup>;
- the heavy weighting of lead times for occupations; and
- the manual adjustment of low or non-skilled jobs to ensure they ranked lower in priority.

These indicators were satisfactory for a growing economy, but as conditions moderated, it became clearer that a more flexible and robust treatment was required.

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<sup>1</sup> Two minor revisions were conducted in 2009 and 2013.

<sup>2</sup> More detail is provided in the *State priority occupation list: Scope, methodology and sources* paper.

<sup>3</sup> Ongoing feedback from WA industry training councils highlighted issues with the term ‘critical occupation’ and potential confusion with respect to final priority ratings. The terminology for these occupations has been updated and they will be referred to as ‘principal occupations’ from 2018 onwards.

## The new methodology

Overall, it was evident by early 2017 that certain aspects of the SPOL methodology should be reviewed to ensure it:

- is flexible enough to account for a range of economic conditions;
- is flexible, clear and transparent enough to allow for a range of policy applications;
- allows for the assessment of impacts of specific policy levers via the weighting of various inputs;
- reflects more actively changes in the market on a year-to-year basis; and
- better aligns with other external labour market datasets and classifications, such as the International Labour Organisation (ILO) definitions of skills mismatch.

The review was conducted in-house by the Department's State Workforce Planning branch, in consultation with various stakeholders including WA industry training councils.

The Department also engaged the Bankwest Curtin Economic Centre (BCEC) to independently review the SPOL methodology and proposed changes and recommend any further changes that may be required. The major contributions from BCEC to the new methodology included:

- endorsing the Department's proposed new approach of separating the market and structural-based elements of the occupational priority index (OPI) to better reflect the real world economy;
- providing a framework for the calculation of a social rate of return for specific occupations, which may be incorporated into SPOL calculations in the future; and
- some preliminary findings from their precariousness of employment research, which may also be included in the SPOL in future years.

## Part 1 – Occupational priority index (implemented SPOL 2018)

The original SPOL was designed in 2010 and much of the focus was around skills shortages and the need to identify 'pressure points' relating to specific occupations in a bullish economy.

As conditions moderated, certain inflexibilities within the methodology became apparent, particularly those concerning the calculation of the occupational priority index (OPI) and:

- better separation in the formula of market elements and structural elements contributing to skills demand; and
- need to better represent qualitative aspects such as skill levels and lead times in a more transparent and robust way.

Feedback received from BCEC also suggested the OPI was too focused on the past and should be weighted more favourably towards forward-looking inputs.

In relation to the first point, this separation was achieved by splitting the original OPI into two separate measures.

- i **A 'Market OPI'** – which will typically include more directly market-based factors relating to each occupation, such as:
  - employment size;
  - future labour demand or supply (FLDOS);
  - past labour demand or supply (PLDOS);
  - average weekly wages; and
  - upcoming job openings.
  
- ii **A 'Structural OPI'** – which will typically include more long term, structural factors relating to each occupation, such as:
  - exposure of workforce to likely retirement;
  - change in the median age;
  - lead time to enter;
  - industry portability; and
  - proportion of workers with qualifications.

Prior to 2018, the OPI was predominantly a market-based indicator with only one structural element: age. For SPOL2018, the age element has been removed from the market OPI and replaced by a new 'job openings' indicator, and a range of new structural indicators have been created. Market-based inputs are more volatile and short term in nature while the structural elements change much more slowly.

The changes for 2018 are illustrated in Table 1, with new indicators shown. A number of further indicators are also proposed, including potential policy-based inputs and some requiring new, yet-to-be-released data. These latter two categories require further research and development for potential inclusion in SPOL2019.

The table also shows the changes for the market-based OPI, which is now weighted more towards forward- and not past-looking indicators.<sup>4</sup>

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<sup>4</sup> More detail on the new indicators is available in the *State priority occupation list: Scope, methodology and sources* paper.

Table 1: Changes to OPI inputs for SPOL2018

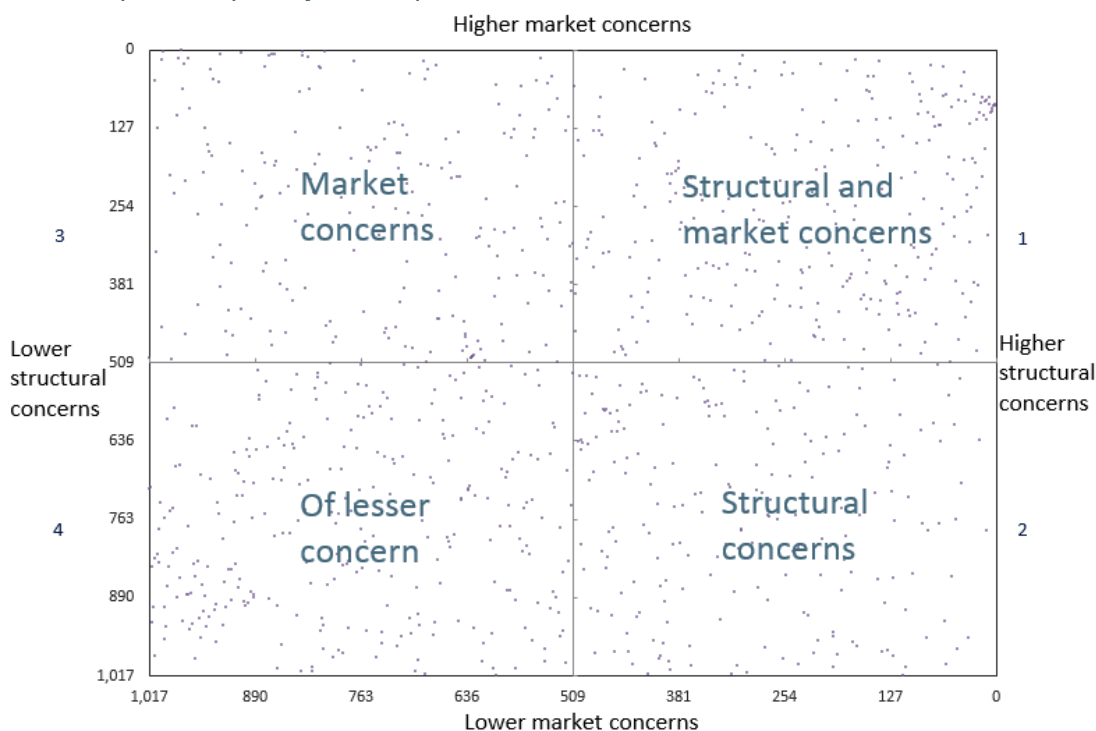
SPOL2010–2017		SPOL2018			
<b>All inputs</b>	<b>Wt %</b>	<b>Market (short term) inputs</b>	<b>Wt %</b>	<b>Structural (long term) inputs</b>	<b>Wt %</b>
Employment	0.10	Employment size	0.10	Retirement exposure indicator	0.10
Future labour demand/supply	0.20	Future labour demand/supply	0.20	Change in median age	0.15
Past labour demand/supply	0.40	Past labour demand/supply	0.30	Lead time	0.30
Average weekly wage	0.15	Average weekly wage	0.10	Industry portability	0.15
Average weekly wage growth	0.05	Average weekly wage growth	0.00	Occupation-qualification usage	0.30
Age	0.10	Job openings	0.30	Employment of skilled youth	0.00
<b>Total</b>	<b>1.00</b>	<b>Total</b>	<b>1.00</b>	Rate of return – VET individual	0.00
				Rate of return – VET social	0.00
				Rate of return – Higher ed individual	0.00
				Rate of return – Higher ed social	0.00
				Precariousness of employment	0.00
				Occupational impact	0.00
				<b>Total</b>	<b>1.00</b>

- Changes for 2018
- Proposed policy-based inputs (2019 onwards)
- Further research required (2019 onwards)
- Not considered for 2018

As per the previous OPI methodology, a z-score<sup>5</sup> was calculated for each element, weighted, summed and ranked for both the market OPI and the structural OPI.

Both values can then be mapped on a scatterplot diagram to provide a two dimensional view of each occupation’s relative position within each index, as illustrated in Figure 1.

Figure 1: Occupational priority index quadrants



Each of the dots in the scatterplot diagram at Figure 1 represents an occupation in WA. The horizontal (x) axis denotes a relative ranking on the structural OPI. The vertical (y) axis represents a relative ranking for the market OPI.

Each quadrant on the scatterplot can then provide a quick visual indicator of which elements may be underlying any specific issues relating to a specific occupation.

<sup>5</sup> A z-score (or a ‘standard score’) indicates how many standard deviations an element is from the mean.

Quadrant 1 denotes there are both structural and market issues at play. Quadrant 2 denotes predominantly structural issues, quadrant 3 market issues and so on.

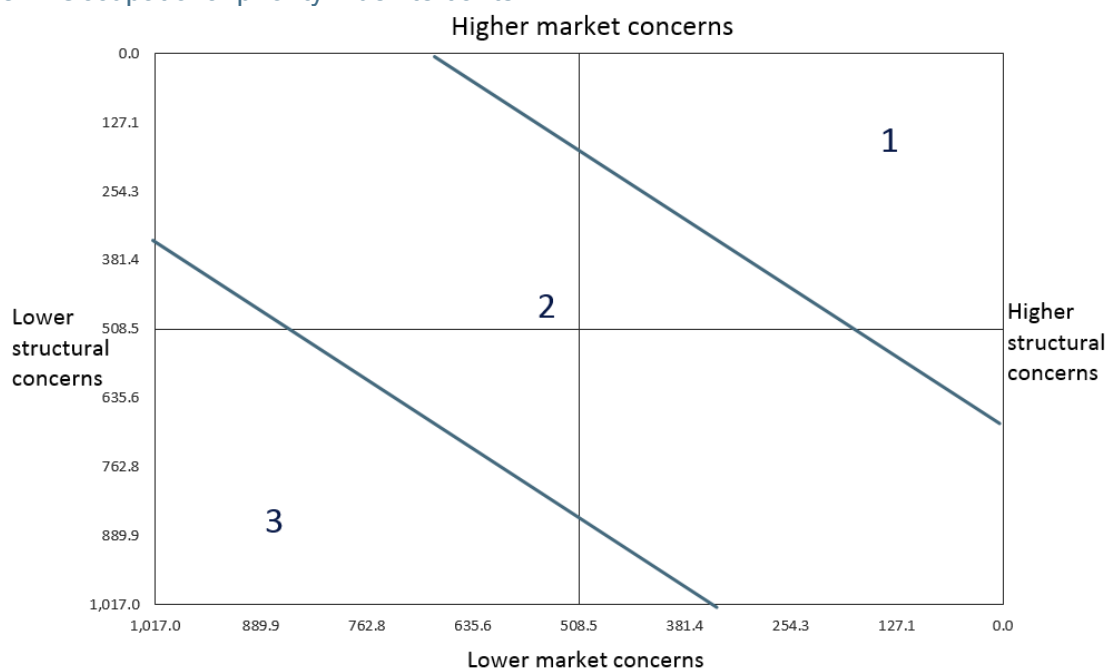
The cluster of dots in the top right corner of quadrant 1 represents most of the high-end medical occupations, which tend to be highly skilled with long lead times, with high wages and ongoing employment demand.

Other highly skilled jobs with less tight labour markets, such as school teachers and nurses, tend to occur in quadrant 2; whereas many high employing but lesser skilled occupations such as sales assistants occur at the upper end of quadrant 3.

Occupations in quadrant 4 are still important contributors to the economy, but are not experiencing any structural or market issues to the same extent as others.

Figure 2 illustrates the scatterplot diagram further divided into thirds, or tertiants.

Figure 2: Occupational priority index tertiants



An occupation's position on the scatterplot will therefore help to determine its final ranking, depending on the availability of additional qualitative evidence, as described in part 2 of this paper.

More detail on the calculation of tertiants is provided in the *State priority occupation list: Scope, methodology and sources* paper.



## Part 2 – Business rules and priority ratings (implemented SPOL 2018)

In addition to the review of the statistical OPI, the business rules and nomenclature relating to the setting of priority rating were also reviewed. The primary focus of this review was to assess whether ratings were still meaningful, and whether the business rules were transparent and flexible enough within the current economic climate.

The nature of qualitative evidence, the role of industry training council input, the questionnaires and the consultation timeframes were out of scope for this review. It is expected that these elements will be reviewed in the latter half of 2018, post the SPOL publication.

### Priority ratings

The final SPOL priority ratings have been simplified. There are now three tiers of priority (down from four) and two tiers of non-priority ratings. The original division of State priority 2 occupations into A and B tiers was considered overly complicated for the overall purpose of the list. All 754 occupations still receive a rating.

The nomenclature was updated to provide a clearer distinction between each tier, as follows.

- **State priority 1** – The highest priority occupations where structural and market driven issues are impacting at the State level.
- **State priority 2** – The second highest level of priority where structural and/or market driven issues are impacting at the State level.
- **State priority 3** – The third tier of priority and representing either occupations of pending concern and/or where supply is essential for the State's economy.
- **Identified occupations** – Refers to occupations where there is inconsistent or conflicting evidence relating to structural or market driven issues. These occupations are closely monitored by the Department.
- **Not identified as a priority** – Refers to occupations with no evidence for inclusion on the priority list.

## **Business rules**

The SPOL business rules provide the framework for integrating both the quantitative and qualitative data sources for the SPOL in producing a final rating. While the broad foundations have not changed, the updated OPI methodology described previously has required some minor amendments to the process flow.

Feedback from industry training councils regarding some principal occupations appearing too high on the list was also incorporated into the new business rules, which can be described as follows.

- **Does sufficient qualitative evidence exist relating to disruption of (an occupation's) labour market or supply chains?**

Evidence is generally provided by the State's industry training council network and verified by the Department, based on OPI data and numerous other economic data sources.

- **Is (the occupation) a principal occupation?**

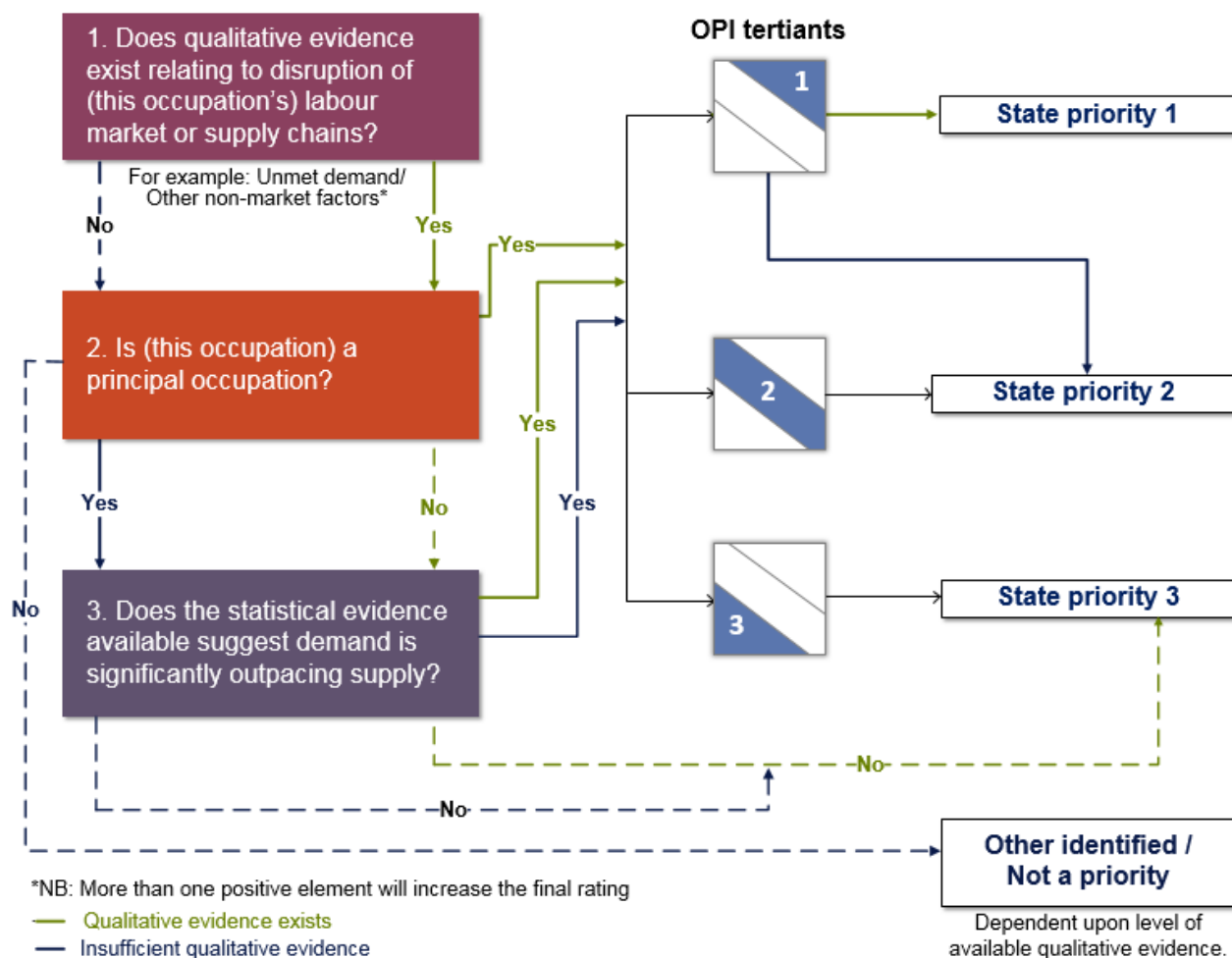
Principal occupations are those where the existence of significant shortages would cause considerable negative economic and/or social effects for the State. It is important to maintain a level of supply for these occupations and thus they will always maintain a minimum rating of priority 3. If there is evidence of market or other disruptions to the supply chain for these occupations, they will be rated more highly on the list.

- **Does the statistical evidence suggest demand is significantly outpacing supply?**

This final qualitative business rule recognises the current effort being made by the State Government in meeting any demand for occupations. While it is important to identify opportunities for employment growth, it is equally important to acknowledge existing supply streams in order to avoid saturating the market with workers who are subsequently unable to find work in their chosen occupation. Where there is both statistical and qualitative evidence of demand outpacing supply streams, occupations will be elevated on the list.

The interplay of these three business rules with available statistical data in determining the final priority rating is perhaps best illustrated in Figure 3.

Figure 3: SPOL2019 business rules for determining priority ratings



The green arrows represent the decision pathway where qualitative evidence is available. The dark blue arrows represent where there is insufficient qualitative evidence.

### Part 3 – Changes to data sources and applications (implemented SPOL 2018)

A number of data inputs for the SPOL have been updated as part of the review and these are outlined below.

#### Census rebasing

The SPOL relies heavily on ABS Census data, as the only reliable and comprehensive source of labour market data at the very detailed level. As it is only released every five years, Census data is used to both verify and apportion less-detailed but timelier data from across state/territory and Commonwealth Government agencies. The release of 2016 Census data meant the Department would be required to rebase the following data underpinning the SPOL.

- University completion data
- Overseas arrivals and departures data
- Labour force survey data
- Net replacement rate forecasts
- Employment forecast data

In addition, the availability of an extra dataset opened further opportunities to examine the potential of applying new statistical techniques and indicators for incorporation into the overall SPOL methodology. Some of these are discussed in the *Review of the occupational priority index* section of this paper.

### **Treatment of labour market supply data**

The SPOL uses vocational education and training (VET) and higher education completions data, mapped to specific ANZSCOs, as a proxy for supply into particular occupations. This is based on a necessary though sometimes unrealistic assumption of strong linkages between qualifications and occupations across the ANZSCO spectrum.

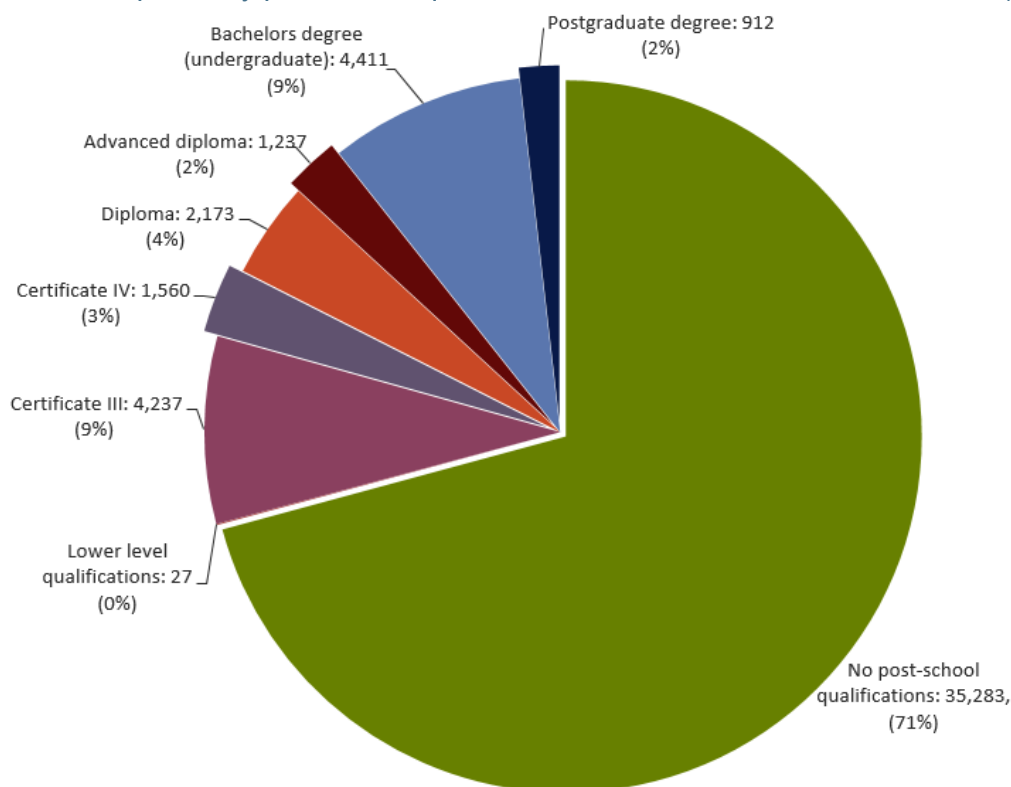
This treatment has the effect of elevating demand-supply mismatch of those occupations with low or poor links with education and training, but where some training does exist. The most extreme example of this phenomenon is with the occupation 621111 – Sales Assistant (General), which always rated highly on demand versus supply indicators under the existing SPOL methodology.

The availability of new Census data allowed for a more in-depth analysis of the strength of VET and higher education pathways into specific occupations at the six-digit level. As shown in Figure 4, over 70% of people in the occupation reported having no post-school qualifications<sup>6</sup>.

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<sup>6</sup> A large proportion of those have higher-level qualifications. In this case, these can reasonably be assumed to be students working part-time as sales assistants.

Figure 4: Occupation by post-school qualification level: 621111 – Sales Assistant (General)



Source: ABS 2016 Census

It was deemed appropriate that any occupational demand calculations used in calculating SPOL values should be moderated according to the proportion of workers (according to the 2016 Census) that have no qualifications or qualifications at a level below that (according to the ABS) notionally ‘required’ for the occupation.

In the case of sales assistants, this meant a preliminary demand figure of over 24,000 was revised downwards to 8,000<sup>7</sup>.

### Inclusion of unemployment data

The original SPOL methodology uses qualifications awarded data as a proxy for one element of labour supply. This is problematic for low-skilled occupations (such as sales assistant above) as it understates the available supply. Theoretically, any person can enter such occupations, regardless of their qualifications, and it was considered appropriate that the unemployed should be treated as a potential labour source for such occupations.

For this reason, unemployment data was included as a labour supply source for low-skilled (ABS ANZSCO Level 5) occupations for the first time in 2018. The average number of unemployed over the year to November 2016 (in line with other ABS labour force data used in the SPOL’s construction), was evenly distributed evenly across all unskilled occupations.

<sup>7</sup> The use of Census field of education was also considered as a basis for moderating demand measures, as was the concept of over-qualification, but data quality issues preclude their use for such purpose.

### **Inclusion of total VET activity data**

The total VET activity (TVA) dataset includes data on private, fee-for-service VET delivery data, which was unavailable prior to 2014. Given that these providers service the same labour market as public providers, TVA represented an opportunity to significantly improve the VET supply data used in the SPOL. By 2017, three years' worth of data was available and quality had improved enough to be considered for inclusion in the SPOL.

The SPOL traditionally has a five-year historical period where it incorporates supply and demand labour market data including qualifications delivered through the VET sector. Despite the TVA dataset only having three years of available data, the remaining two years comes from the Department's own administrative data (as the State training authority). This is the former VET data source for SPOL and is also a key input into the TVA dataset for WA. This practice will be phased out over the coming years as more TVA data becomes available.

### **Phase-out of arrivals and departures data**

On 1 July 2017, the Commonwealth Government's Department of Home Affairs implemented changes to the arrivals and departure processes for all inbound and outbound international travellers. This included the removal of the requirement for passengers to complete departure cards.

These departure cards included information relating to reason for travel, the expected time away and the occupation of the traveller. Combined with arrivals data, this data was used to monitor the flows of Australian citizens and permanent residents in and out of the WA labour market. It was also used as a proxy dataset to replace administrative data on temporary visa holders exiting the country, which was no longer made available by the Department of Home Affairs.

The removal of departure data meant the remaining arrival-based data would not provide a complete and accurate picture of such flows. The data series was therefore deemed unsuitable from 2017 onwards, and will be gradually phased out of supply calculations.

## **Part 4 – New industry consultation methodology and qualitative occupation assessment (implemented for 2019)**

A new consultation methodology and survey vehicle has been designed in light of the changing labour market circumstances of Western Australia and the broader range of labour market issues the SPOL now monitors compared to earlier releases. The Department also noted the limited scope of issues (primarily high demand or unmet demand) that advisory bodies could raise to influence SPOL ratings in the past was not appropriate in the softer market conditions being experienced in Western Australia today.

### **The ‘by-exception’ approach**

Historically the SPOL process called for submission from the training council network across the entire spectrum of ANZSCO occupations. Once submissions were received, a rigorous process was undertaken to analyse and validate all evidence, including statistical data as well as training council submissions. Generally around 350 occupations were examined in detail each year over a period of two-to-three months, with a final SPOL released in September of that same year.

While comprehensive and rigorous, it was a time consuming process, and the relatively late SPOL release limited the opportunity for early gazettal of the following year’s course fee rates. Additionally, the level of concordance of statistical information with that gathered from SPOL consultations was very high – generally around 85% or above, which indicated there may be opportunities to streamline the consultation and validation processes.

Consequently, a new ‘by-exception’ approach to SPOL consultations was trialled in 2019. Under this approach, the Department produced a preliminary draft SPOL, including priority ratings and written verdicts for all 799 SPOL eligible occupations, and provided this list, with the OPI data and all supporting statistical evidence<sup>8</sup> to the training council network, seeking their input and comment.

Where the training councils’ views – based on evidence from their own ongoing consultations with their industry stakeholders – were substantively in accordance with the evidence and draft ratings provided, training councils were required only to endorse the draft SPOL rating and were not required to provide any additional evidence. Where a training council disagreed with a draft rating, they were asked to provide evidence to support their position.

The draft SPOL was sent to the industry training councils in March 2019. 311 responses were received relating to 277 unique occupations (some occupations crossed multiple industries requiring multiple responses). 280 responses agreed with the draft rating– this represented a 90% agreement rate with the draft SPOL ratings provided by the Department. An additional 31 responses were received where training councils disagreed

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<sup>8</sup> This only occurred where the Department is legally able to do so. Some statistical evidence that is used to build the SPOL is owned by Commonwealth Government agencies and cannot be distributed to the public or third parties.

with the draft SPOL rating or raised other occupations that should be considered for priority status.

Of the 311 responses received, 115 included a written submission requiring Departmental review. Eighty five of these written submissions did not seek a rating change but only sought to provide some information to the Department about the occupation in question. Because of training council submissions, six occupations had an increase in their priority ratings, while one occupation had a rating decrease.

### **New questionnaire**

Historically, the SPOL consultation process required training councils to complete a pre-set survey template for each occupation. This helped ensure that all industry advice was focused on labour market demand and supply issues and/or specific issues impacting the training requirement for particular occupations<sup>9</sup>. As stated earlier, it was becoming increasingly apparent that this focus was too narrow and was not providing a broad enough narrative, particularly during weaker market conditions. Further, the new 'by-exception' approach required a review of the questionnaire to ensure appropriate evidence was still being captured where possible.

The result was a simplified questionnaire<sup>10</sup>, with only three questions, which were designed to:

- reduce the administrative burden on training councils;
- seek endorsement or otherwise for draft SPOL ratings;
- seek evidence where training councils had concerns regarding a draft rating; and
- remove the need for specialist knowledge of labour market-related concepts, and broaden the scope of issues which could be raised by training councils via the SPOL consultation process.

### **Additional indicators**

To cope with the broader range of issues that could be raised by training councils using the new questionnaire, a new suite of additional indicators were developed. Occupations may be flagged with a range of labour market indicators where there are compelling reasons and supporting evidence. The majority of these indicators are in line with International Labour Organisation (ILO) definitions. On their own, these indicators do not systematically affect the final SPOL rating, but they do allow far greater flexibility for determining priorities and appropriate policy responses at an occupational level across the Western Australian labour market.

As the system becomes embedded and more evidence is gathered relating to these additional indicators, it is envisioned they will play an ever-greater role in coming years.

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<sup>9</sup> See the *Scope, Methodology and Sources* paper for more information.

<sup>10</sup> See the *Scope, Methodology and Sources* paper, *Appendix 3* for a copy of the new questionnaire.



The list of additional indicators included for SPOL2019 are listed below:

- High demand
- Adequate supply
- Oversupply
- Sub-occupation issues
- Skills gap
- Vertical mismatch
- Horizontal mismatch
- Over education or under education
- Over qualification or under qualification
- Skills obsolescence
- Government policy
- Experience
- Watch list

Definitions and hypothetical examples of these indicators can be found in Appendix 7 of the *Scope, Sources and Methodology* paper.

### **Where to from here?**

Further refinements to a number of the statistical elements will continue to be examined, such as:

- further work on governance processes surrounding the determination of OPI weightings – in response to issues raised by the BCEC researchers in 2018; and
- investigation of additional 'big data' sources and the development of appropriate structural and market indicators from these data sets to incorporate into the OPI and for individual occupational assessment.



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