This discussion paper has been written by officials of the Welsh Government. Ministers have not had an opportunity to comment on the contents. Exemplifications of changes are provided simply to inform discussion by DSG members. They are not Welsh Government proposals or statements of Government policy for or against changes.

Measuring Sparsity within the Settlement: Settlement Thresholds - Background, Principles and Initial Steps

Summary

1. This paper summarises the current situation regarding sparsity indicators within the Settlement and investigates proposals of updated settlement threshold indicators for the **2025-26 Settlement and beyond**. The current sparsity and dispersion indicators are based on the oldest data used in the formula.

2. The DSG is recommended to agree, in principle, the analysis of a new set of sparsity settlement threshold indicators based on the 2011 Census (2021 Census depending on availability). The analysis will form part of a DSG workshop.

Views sought:

3. Members' views are sought on the recommendation to use the available 2011 Census Settlement Threshold Indicators to **test** updating the '**Nursery and Primary School Teaching and Other Services'** IBA.

4. DSG are also asked to discuss availability of setting a provisional date on holding a **data workshop** in **September**.

Section 1: Background and Current Situation

5. The formula for calculating the Local Government Revenue Settlement contains indicators of **sparsity** that are designed to account for the **increased costs of service delivery in rural areas**.

6. Currently, within the Settlement, two types of indicators measure sparsity: **settlement threshold indicators** and **dispersion threshold indicators**. These were designed and developed by Pion Economics and based on Census population profiles.

7. The construction of the **settlement threshold indicators** can be summarised as follows:

    Rationale: Urban areas (large settlements) can achieve economies of scale in provision of services to large populations that are not available in rural areas due to the need to duplicate provision in providing access.

Logic: The proportion of the population outside large settlements provides a broad indicator of the extent of economies of scale lost, or the additional cost burden in supplying comparable services in rural areas.

Measurement: The population in an authority living outside settlements above a certain population threshold.

8. The construction of the **dispersion threshold indicators** can be summarised as follows:

Rationale: Delivery of services to dispersed communities in rural areas can incur additional time, distance and financial costs.

Logic: The pattern of population dispersion across authorities will be reflected in delivery costs.

Measurement: The population weighted distance[1] from each Output Area[2](the lowest level of geographical area for census statistics) to defined 'Key Settlements' in each authority area with the latter defined on the basis of population thresholds.

9. At present, the following sparsity indicators are used within the Settlement, based on the 1991 Census:

   • Dispersion indicator distances from settlements of size 2,500;
   • Dispersion indicator distances from settlements of size 5,000;
   • Settlement threshold 1,000;
   • Settlement threshold 7,500;
   • Settlement threshold 12,500;
   • Settlement threshold 30,000;
   • Settlement threshold 40,000; and
   • Population within settlement threshold 50,000[3].

10. In addition to these, two further sparsity indicators, based on the 2001 Census, were added in 2011-12 following the work of the Sparsity Working Group:

   • Dispersion indicator distances from settlements of size 300; and
   • Dispersion indicator distances from settlements of size 7,500.

11. **Table 1** in **Annex A** illustrates which formula-based IBAs use the above sparsity indicators and how much SSA is distributed on each indicator within each IBA (based on the 2023-24 Settlement).

12. The amount of SSA distributed on the sparsity indicators within these IBAs is around £409 million (5.54% of the total SSA). *Nursery and Primary school teaching and other services* accounts for almost £129 million (1.74%). Note that

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[1] 'Population-weighted distance' means that you take the distance from an Output Area to a 'Key Settlement and then multiply by the number of people in that 'Key Settlement'. These numbers are then summed to give the value of the dispersion indicator.
[2] Output area production - Office for National Statistics (ons.gov.uk)
[3] This indicator is different from the other settlement indicators in that it is used to allocate more funding to authorities with a higher population in large settlements. In this sense, it is not a measure of sparsity, but a measure of high population density.

sparsity indicators also have a minor financial impact on service IBAs such as General Administration and PSS Administration.

13. **Table 2** in **Annex A** aggregates these values up to show the amount of SSA distributed on each of the sparsity indicators.

Section 2: Future Treatment of Sparsity Indicators – Settlement Threshold Indicators within the Settlement

14. In the 2023-24 Settlement, over £352 million of funding within the Settlement was distributed on sparsity indicators constructed from data based on the 1991 census and almost £57 million was distributed on data based on the 2001 Census.

15. In 2014 (Paper 06: Measuring Sparsity within the Settlement: Background, Principles and Initial Steps) DSG agreed with the recommendation to create and implement a new set of sparsity settlement threshold indicators based on the then latest methodology and data from the 2011 Census.

16. As the methodology previously developed and employed by Pion Economics to construct the current sparsity indicators was not made sufficiently transparent to allow an exact reproduction of the indicators, Welsh Government officials developed a standard published source that had a clearer, defined methodology to create a similar set of indicators that could be explainable to a non-technical audience. A new set of sparsity settlement threshold indicators was produced from the data of the 2011 Census. These indicators were not adopted at the time due to concerns about the impact on the distribution at a time of reducing budgets.

17. Welsh Government officials are in the process of developing another set of new sparsity indicators based on the 2021 Census. A similar methodology to the 2011 Census is expected to be incorporated.

Section 3: Background on the Underlying Methodology

18. As part of the 2011 Census outputs, the Office for National Statistics (ONS) published a new version of its statistical settlements in Wales and England.

19. These statistical settlements were a new geography of built-up areas and built-up area sub-divisions (referred to in this paper as "built-up areas").

20. The object of this geography was to identify the centres of population for statistical purposes to analyse general demographic, social and economic statistics across various settlement sizes or perhaps between individual large settlements.

21. This geography had a number of strengths and weaknesses summarised as follows:

- Main strengths:
  - Publicly available and branded as 'National Statistics'

- Published, credible, methodology that can be replicated
- Consistent definitions applied over the whole of Wales and England
- Flexible settlement size bands available for use
- Updatable
- Can be linked with standard statistical geographies as a tool to analyse a wide range of statistical sources in a consistent way.

- Main weaknesses:

    - Different methodology from the current system used in the Settlement, meaning that the allocation of funds may be different
    - Strict application of rules over the whole country can lead to discrepancies at the local level, which will need careful consideration and explanation
    - Identification of the very smallest settlements (of a few hundred people) can be an issue
    - Changes in methodology between 2001 and 2011 do not allow for analysis of change over time in a settlement.

22. Welsh Government officials checked the relevance of this methodology and concluded that it meets the criteria for a good indicator and consider it to be more robust and far superior to the 'black box' methodology used by Pion.

23. A more detailed description of the methodology will be provided by our Welsh Government officials at the DSG workshop.

Section 4: Settlement Threshold Indicators

Settlement threshold Indicators:

24. The 2011 settlement threshold indicators have been constructed in very much the same way as those previously. However, different thresholds will need to be tested against current expenditure patterns in order to determine those which most accurately reflect the need to spend across authorities.

25. One such threshold may be a population of 10,000. This settlement indicator would then be defined for each authority as the population within that authority living <u>outside</u> of built up areas of population 10,000 or greater. (This could also be thought of as the population in an authority living in built-up areas with a population less than 10,000, plus those living in non-built-up areas.)

26. **Definition 1: A settlement indicator at a given threshold is calculated as an authority's population living <u>outside</u> built-up areas with populations above that given threshold.**

27. For the settlement indicator that measures dense populations, the population <u>within</u> settlements of a given threshold will need to be calculated.

28. **Definition 2: A settlement indicator in the form of a population within a given settlement threshold is calculated as an authority's population living <u>within</u> built-up areas with populations above that given threshold.**

29. In 2014 (Paper 06: Measuring Sparsity within the Settlement: Background, Principles and Initial Steps) DSG also discussed Cross-Border / Boundary issues.

Members agreed that, for the purpose of constructing the settlement indicators, built-up areas should be allowed to cross boundaries.

Section 5: Next Steps

30. As part of the DSG work programme GIS expertise has been sought out and data analysis is underway using the available Census 2011 settlement threshold indicators. Welsh Government officials are in the process of developing another set of settlement threshold indicators based on the 2021 Census using a similar methodology.

31. Currently the local government finance team have begun testing analysis on the recalibration of the formula for the '**Nursery and Primary School Teaching and Other Services'** IBA. This includes multiple linear regression analysis on the Census 2011 settlement threshold data, pupil data, school data, FSM data and educational expenditure data.

32. It is the intention that a **Data workshop** will be held in **early September**. This will include expertise from Welsh Government officials on the methodology of settlement thresholds as well as deriving an updated '**Nursery and Primary School Teaching and Other Service'** formula using the latest settlement threshold data.

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Annex A

Table 1: Breakdown of Sparsity Indicators currently used in the Formula-Based service IBAs, 2023-24

Sector	Service Area	Sparsity Indicator (Census Year)	Weight	SSA Service IBA (£)	Individual Indicator SSA (£)	Proportion of total SSA (%)
Education	Nursery and Primary school teaching and other services	Settlement Threshold 1,000 (1991)	0.098	1,311,799,322	128,556,334	1.74%
	Secondary school teaching and other services	Settlement Threshold 7,500 (1991)	0.055	1,048,901,370	57,689,575	0.78%
	Special Education	Settlement Threshold 40,000 (1991)	0.100	323,895,509	32,389,551	0.44%
	School meals	Dispersion Threshold 2,500 (1991)	0.165	68,509,640	11,304,091	0.15%
	Adult and continuing education transport	Settlement Threshold 12,500 (1991)	0.700	11,718,004	8,202,603	0.11%
PSS	Children and young persons	Dispersion Threshold 300 (2001)	0.032	667,253,076	21,352,098	0.29%
		Dispersion Threshold 300 (2001)	0.014		10,257,715	0.14%
	Younger adults' personal social services	Dispersion Threshold 7,500 (2001)	0.003	732,693,940	2,198,082	0.03%
		Dispersion Threshold 300 (2001)	0.016		12,527,303	0.17%
	Older adults' residential and domiciliary care	Dispersion Threshold 7,500 (2001)	0.013	782,956,411	10,178,433	0.14%
		Dispersion Threshold 300 (2001)	0.016		21,280	0.00%
	NHS Funded Nursing Care	Dispersion Threshold 7,500 (2001)	0.013	1,330,000	17,290	0.00%
Transport	Public transport revenue support	Settlement Threshold 7,500 (1991)	0.734	18,986,760	13,936,282	0.19%
Other Services	Other environmental health and port health	Settlement Threshold 7,500 (1991)	0.050	51,462,504	2,573,125	0.03%
	Refuse collection	Dispersion Threshold 5,000 (1991)	0.176	258,721,530	45,534,989	0.62%
		Settlement Threshold 30,000 (1991)	0.737		32,122,570	0.44%
	Cultural services	Pop within Settlement Threshold 50,000 (1991)	0.263	43,585,576	11,463,006	0.16%
	Recreation	Settlement Threshold 7,500 (1991)	0.050	177,632,645	8,881,632	0.12%
Total SSA of formula-based services which use Sparsity Indicators					409,205,959	5.54%
Total SSA					7,384,154,581	100.00%

Annex A

Table 2: Aggregation of Sparsity Indicators, 2023-24

Indicator	Setllement 2023-24 SSA (£)
Settlement Threshold 1,000 (1991)	128,556,334
Settlement Threshold 7,500 (1991)	83,080,614
Settlement Threshold 12,500 (1991)	8,202,603
Settlement Threshold 30,000 (1991)	32,122,570
Settlement Threshold 40,000 (1991)	32,389,551
Population within Settlement Threshold 50,000 (1991)	11,463,006
Dispersion Indicator distances from settlements of size Threshold 300 (2001)	44,158,396
Dispersion Indicator distances from settlements of size Threshold 2,500 (1991)	11,304,091
Dispersion Indicator distances from settlements of size Threshold 5,000 (1991)	45,534,989
Dispersion Indicator distances from settlements of size Threshold 7,500 (2001)	12,393,805
Total SSA	**409,205,959**

Annex B

Related papers

Distribution sub-group (2014)
- Paper 10 - Measuring Sparsity within the Settlement: Dispersion Indicators Progress Report (Technical Accompaniment)
- Paper 10 - Measuring Sparsity within the Settlement: Dispersion Indicators Progress Report
- Paper 09 - Measuring Sparsity within the Settlement: Settlement Indicator Analysis
- Paper 06 - Measuring Sparsity within the Settlement: Background, Principles and Initial Steps (Technical Accompaniment)
- Paper 06: Measuring Sparsity within the Settlement: Background, Principles and Initial Steps
- Paper 04: Review of Sparsity Indicators in the Settlement

Distribution sub-group (2013)
- Paper 04: Review of Sparsity Indicators in the Settlement

Distribution sub-group (2010)
- Paper 10: General Approach to Measuring Rurality

Sparsity Working Group (2009)
- Paper 2: Different Approaches to Measuring Rurality

Distribution sub-group (2006)
- Paper 4: Revisiting PSS Models for Variant 3 of Settlement and Dispersion Indicators

Distribution sub-group (2005)
- Paper 48: Settlement And Dispersion - R2 Comparison
- Paper 42: Settlement And Dispersion Indicators – Summary Paper
- Paper 41: Settlement And Dispersion Indicators – Variant 5
- Paper 40: Settlement And Dispersion Indicators – Variant 4
- Paper 39: Settlement And Dispersion Indicators – Variant 3
- Paper 38: Settlement And Dispersion Indicators – Variant 2
- Paper 28: Public Transport Revenue Support (Updating Sparsity Indicators)
- Paper 27: Refuse Collection (Updating The Sparsity Indicators)

Annex B

- Paper 26: Cultural Services (Updating The Sparsity Indicators)
- Paper 25: School Meals (Updating The Sparsity Indicators)
- Paper 21: Exemplification Summary - Settlement/Dispersion Indicators
- (Also Papers 10 to 20)

Pion Economics Report (2005)
- Updating Settlement and Dispersion Indicators

Distribution sub-group (2004)
- Paper 48: Updating the settlement and dispersion indicators
- Paper 44: Updating the settlement and dispersion indicators
- Paper 21: National Statistics settlement classification