Appendix C7. Health Effects AMSTAR Quality Assessment Results

The table below displays the results of the modified tool CalSPEC used to evaluate the quality of the 9 systematic reviews.

Results of AMSTAR 2 Quality Assessment

Review	AMSTAR Criteria																Overall Confidence
	1	2*	3	4*	5	6	7*	8	9*	10	11*	12	13*	14	15	16	
HEI 2022**	+	P	-	-	+	+	+	+	+	-	+	+	+	+	+	-	Low
National Toxicology Program 2019	+	+	-	+	+	+	P	P	+	-	+	+	+	+	+	+	Moderate
Peters et al. 2019	+	+	+	-	+	-	+	-	P	-	NA	NA	+	+	NA	+	Low
Pizzol et al. 2020	+	-	-	P	+	+	P	-	-	-	-	-	-	-	+	-	Critically Low
Power et al. 2016	+	P	-	P	+	+	P	-	-	-	NA	NA	+	+	NA	+	Low
Praud et al. 2023	+	P	-	P	+	-	P	-	-	-	+	+	+	+	+	+	Low
Siegel et al. 2023	+	P	-	P	+	+	-	-	-	-	NA	NA	-	-	NA	+	Critically Low
Tang et al. 2022	+	+	-	P	-	+	P	+	-	-	+	-	+	+	+	+	Low
Zhao et al. 2016	+	+	-	P	-	+	P	-	-	-	+	+	+	+	+	+	Low

*AMSTAR 2 critical domain; + = Yes; - = No; P = Partial yes; NA = No meta-analysis conducted
**AMSTAR criteria 11-15 were assessed by outcome for this review, as the review authors had unique methodologies for each outcome. For all outcomes, HEI (2022) received the same AMSTAR ratings.
Note: CalSPEC considered reviews of high, moderate, and low quality sufficient to establish evidence of an association between NRAP exposure and health outcomes.

AMSTAR Items

1. Did the research questions and inclusion criteria for the review include the components of PI/ECO (population, intervention/exposure, comparator, outcome)?

2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?*

3. Did the review authors explain their selection of the study designs for inclusion in the review?

4. Did the review authors use a comprehensive literature search strategy?*

5. Did the review authors perform study selection in duplicate?

6. Did the review authors perform data extraction in duplicate?

7. Did the review authors provide a list of excluded studies and justify the exclusions?*

8. Did the review authors describe the included studies in adequate detail?

9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?*

10. Did the review authors report on the sources of funding for the studies included in the review?

11. If meta-analysis was performed, did the review authors use appropriate methods for statistical combination of results?*

12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?

13. Did the review authors account for RoB in primary studies when interpreting/discussing the results of the review?*

14. If meta-analysis was performed, did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review? If meta-analysis was not performed, did the review authors discuss the reasons why, including a discussion of heterogeneity?

15. Did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?

16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?

We rated one review "Moderate" quality (National Toxicology Program 2019), six were rated "Low" quality (HEI 2022, Peters et al. 2019, Power et al. 2016, Praud et al. 2023, Tang et al. 2022, and Zhao et al. 2016), and two were rated "Critically Low" quality (Siegel et al. 2023 and Pizzol et al. 2020). Six of the nine reviews were downgraded for not conducting an appropriate risk of bias assessment (Domain 9). HEI (2022), which evaluated 19 of the 24 health outcomes, was rated low quality due to the lack of a comprehensive search strategy, as the authors did not justify publication restrictions by date. CalSPEC considered systematic reviews of 'Low', 'Moderate' or 'High' quality sufficient to draw conclusions about the health effects of NRAP; reviews rated "Critically Low" quality were excluded from further analysis.