13 February 2026

TO:	**Department of Forestry, Fisheries and the Environment** **Director-General** **Simon Moganetsi**	Smoganetsi@dffe.gov.za	
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Dear Simon Moganetsi

RE: PROPOSED REGULATIONS PERTAINING TO THE EXPLORATION AND PRODUCTION OF ONSHORE PETROLEUM RESOURCES REQUIRING FRACTURING TECHNOLOGY AND RELATED REGULATIONS

1. Thank you for the opportunity to comment on the proposed regulations pertaining to the exploration and production of onshore petroleum resources requiring fracturing (fracking) technology, published for comment on 7 November 2025 in Government Gazette 53637 under Government Notice 6806 (the "**Exploration and Production Regulations**") by the Department of Forestry, Fisheries and the Environment ("**DFFE**") in terms of the National Environmental Management Act 107 of 1998 ("**NEMA**"). The Draft Regulations were published simultaneously with three related regulations: the Minimum Information Requirements for the Exploration and Production of Onshore Petroleum using Fracturing Technology ("**Minimum Information Requirements Regulations**"); the Minimum Information Requirements for Baseline Monitoring for Onshore Exploration Operations ("**Baseline Monitoring Regulations**"); and the Onshore Well Decommissioning Guidelines prepared by the Petroleum Agency of South Africa ("**Decommissioning Regulations**") (collectively, "**the Regulations**"). All four initially provided for a public comment deadline of 8 December 2025. However, on 1 December 2025, in Government Gazette 53763 under Government Notice 6892, the Minister extended the deadline to 13 February 2026.

2. These comments are submitted by the Biodiversity Law Centre ("**BLC**"), a non-profit law centre that uses the law to protect and restore indigenous species and ecosystems that support sustainable livelihoods in Southern Africa. The BLC is particularly concerned with law and policy that give effect to section 24 of the Constitution, and the State's obligations to protect the environment for present and future generations, by preventing pollution and ecological degradation, promoting conservation, and securing ecologically sustainable development.

3. These comments are endorsed by Natural Justice, the Centre for Environmental Rights, Southern African Faith Communities' Environment Institute, and the Green Connection.

4. The BLC also endorses the comments made by Natural Justice and the Centre for Environmental Rights.

5. The BLC's particular interest in biodiversity arises as South Africa is the third most biodiverse country in the world.[1] Biodiversity is defined as-

> '*the variability among living organisms from all sources including…aquatic ecosystems and the ecological complexes of which they are part*',[2] and is-
>
> '*foundational to the wellbeing of [South Africa's] people giv[ing] our people food, clean water, medicine and materials; support[ing] agriculture and fisheries; offer[ing] resilience against disasters; and provid[ing] the basis of a vibrant tourism industry while offering natural spaces for recreational and cultural activities.*'[3]

6. Biodiversity is also essential for climate change adaptation and mitigation.[4]

7. Under the Convention on Biological Diversity ("**CBD**")[5], Parties, including South Africa, adopted the Kunming-Montreal Global Biodiversity Framework ("**GBF**")[6] in response to biodiversity deteriorating worldwide at unprecedented rates,[7] with the aim of galvanising urgent and transformative government action to halt and reverse biodiversity loss.[8]

8. The GBF sets interim targets to be reached by Parties by 2030:

   8.1. Target 2, restore 30% of all degraded ecosystems;

   8.2. Target 4, seeks to halt species extinction, protect genetic diversity, and manage human-wildlife conflicts by '*ensur[ing] urgent management actions to halt human induced extinction of known threatened species and for the recovery and conservation of species, in particular threatened species, to significantly reduce extinction risk*';

   8.3. Target 7, which seeks to reduce pollution to levels that are not harmful to biodiversity;

   8.4. Target 8, which seeks to minimize the impacts of climate change on biodiversity and build resilience; and

   8.5. Target 14, which seeks to integrate biodiversity in decision-making at every level.

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[1] https://www.biofin.org/south-africa.
[2] National Environmental Management: Biodiversity Act 10 of 2004 ("NEMBA") section 1(1) definition of "biodiversity".
[3] South African National Biodiversity Institute (SANBI). 2025. National Biodiversity Assessment 2025: The status of South Africa's biodiversity. Summary of Findings and Key Messages. Skowno, A.L., Poole, C.J., Besseling, N.A., Currie, J.C., Da Silva, J.M., Dayaram, A., Harris, L.R., Job, N., Monyeki, M.S., Mtshali, H., Raimondo, D.C., Sink, K.J., Van der Bank, M.G., Van der Colff, D., Van Niekerk, L., Von Staden, L. South African National Biodiversity Institute (an entity of the Department of Forestry, Fisheries and the Environment), Pretoria. https://hdl.handle.net/20.500.12143/9467 ("2025 NBA").
[4] 2025 NBA at page 5.
[5] United Nations. (1992). Convention on Biological Diversity. https://www.cbd.int/convention/text/.
[6] Kunming-Montreal Global Biodiversity Framework UN Doc UNEP/CBD/COP/DEC/15/4 (2022).
[7] GBF at section A 2.
[8] GBF at section B 4. Among the GBF's goals for 2050 are:
Goal A: "Protect and restore", which includes that 'the integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050'.
Goal B: "Prosper with nature", being that 'biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050'.

9. NEMA requires international responsibilities relating to the environment to be discharged in the national interest,[9] bolstering the CBD and GBF's obligations on the State to protect ecosystems and the biodiversity they support.

10. It is in this context that our comments are particularly aimed at addressing biodiversity concerns that arise from the draft Regulations. As such our comments are structured as follows:

    10.1. General comments:

        10.1.1. Monitoring and access to information;

        10.1.2. Incorrect authority cited;

        10.1.3. Technology omission;

        10.1.4. Water ecosystems;

        10.1.5. Aquatic biodiversity;

        10.1.6. Terrestrial biodiversity;

        10.1.7. Climate change; and

        10.1.8. Cumulative impacts.

    10.2. Specific comments.

    10.3. Conclusions and recommendations.

11. Fracking is a controversial activity that has faced sustained resistance from civil society across many jurisdictions and is banned in multiple countries.[10] A substantial body of evidence from countries where it operates documents environmental and social impacts in affected areas. We therefore request that these and other concerns be carefully considered, including the position that fracturing technology should not be utilised in South Africa.

[9] NEMA section 2(4)(n).
[10] 'What is fracking and why is it controversial?' 1 October 2025 https://www.bbc.com/news/articles/c9v73r1ljl0o.

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GENERAL COMMENTS

12. The comments below are to be read in conjunction with those made by Natural Justice and the Centre for Environmental Rights ("**CER**").

13. The BLC's comments focus on the Exploration and Production Regulations, however, in addition to the below, we submit that the other three sets of regulations contain fundamental flaws,[11] including:

    13.1. Scientific evidence for the calculation of the risk of geological or engineered barriers failing does not appear to have been developed in the "Decommissioning Regulations" (see section 3.1). Moreover the "Decommissioning Regulations" have been put out by DFFE under NEMA, but reference predominantly the Mineral and Petroleum Resources Development Act[12] ("**MPRDA**"). Certainly, the impact geological or engineering failures would massively impact water resources. It is thus entirely unclear which agency would exercise oversight over this critical aspect.

    13.2. The "Baseline Monitoring Regulations" have not been comprehensively developed. Section 3.6 of the regulations, covering terrestrial Biodiversity and species, is an extremely basic list of biodiversity information and envisages species as static or fixed entities and does not conceptualise e.g. interactions or cumulative impacts.

    13.3. The "Minimum Information Requirements Regulations", omit the conceptualisation of cumulative impacts and their interactions across all the shale gas development sites. This is contrary to the legal requirements for minimum information in relation to Environmental Impact Assessments ("**EIA**").

14. In addition to the above, we discuss in detail comments and objections to the proposed Regulations, and in particular, the Exploration and Production Regulations.

A. Monitoring & Access to Information: transparency, oversight and accountability

15. Transparency and accountability are fundamental in a constitutional democracy like South Africa.[13] The public has an interest in knowing what risks and possible harms are involved in fracking (to the environment and ecosystems, and human life and health), grounded in the constitutional right to an environment not harmful to our health or wellbeing.[14] The State, the custodian holding the environment in public trust,[15] has the corresponding duty to protect and fulfil this right.[16]

16. The importance of transparency and accountability in environmental matters is reflected in the NEMA principles in that –

    16.1. decisions must be taken openly and transparently, and access to information must be provided in accordance with the law;[17]

[11] See further Peter Carrick opinion, attached to this submission.
[12] Act 28 of 2002.
[13] *Public Protector v South African Reserve Bank* (CCT107/18) 2019 (6) SA 253 (CC).
[14] Section 24(a) of the Constitution.
[15] See references in sections 28(5)(e) and 30(6)(d) of NEMA.
[16] Section 7(2) of the Constitution.
[17] Section 2(4)(k) of NEMA.

16.2. the social, economic and environmental impacts of activities, including disadvantages and benefits, be considered, assessed and evaluated, and that decisions be appropriate in the light of such consideration;[18]

16.3. the participation of all interested and affected parties in environmental governance be promoted, with participation by vulnerable and disadvantaged persons ensured, and opportunities created for people to develop the understanding, skills and capacity necessary for equitable and effective participation;[19] and

16.4. community wellbeing and empowerment must be promoted through environmental education, raising environmental awareness, knowledge sharing and other appropriate means.[20]

17. Baseline assessments and continued monitoring is imperative in revealing fracking's cumulative and unforeseen impacts on water resources, biodiversity, air quality and human health, and to evaluate the effectiveness of mitigation measures.[21] It is therefore a legal imperative that the Regulations promote and provide for transparency and accountability, particularly in relation to monitoring and access to information.

18. We welcome the Regulations' focus on monitoring, in its purposes which include providing for the preparation and implementation of a Baseline Monitoring Plan ("**BMP**") before exploration fracturing operations begin;[22] setting requirements for ongoing environmental monitoring of both exploration and production fracking operations;[23] and effecting coordination between decision-making authorities on the requirements for baseline monitoring and integrated operational monitoring.[24] We also welcome the provision for public disclosure of information on fracturing operations, including to effective coordination between authorities regarding public participation requirements.[25]

19. However, the Regulations fall short of their constitutional imperative, their obligations in terms of NEMA and the crucial role of monitoring and public disclosure of information in that they –

19.1. provide for inadequate State oversight of monitoring done by fracturing operators; and

19.2. do not provide for a centralised database of fracturing operators' monitoring records and other information that is needed for oversight.

20. It must be noted how crucial public access to information is. Without mandatory disclosure to the public, and through a mechanism that easy to access, affected communities cannot assess risks and independent scientific scrutiny is limited, which may result in environmental harm going undetected. The Regulations should contain a requirement that information, particularly in terms of assessments and monitoring, be made publicly available in a timely manner and on government's website, which we discuss further below.

21. In addition to the above, while certain substances may be prohibited or regulated, the Regulations do not appear to require full public disclosure of all chemicals used, including concentrations. They also do not have a requirement to disclose incidents, spills or well failures. Lastly, there should be a public

[18] Section 2(4)(i) of NEMA.
[19] Section 2(4)(f) of NEMA.
[20] Section 2(4)(h) of NEMA.
[21] See Scholes, R., Lochner, P., Schreiner, G., Snyman-Van der Walt, L. and de Jager, M. (eds.). 2016. *Shale Gas Development in the Central Karoo: A Scientific Assessment of the Opportunities and Risks*. CSIR/IU/021MH/EXP/2016/003/A, ISBN 978-0-7988-5631-7 at pages 31, 38, 42 and 53.
[22] Regulation 2(d) of the Exploration and Production Regulations.
[23] Regulation 2(e) of the Exploration and Production Regulations.
[24] Regulation 2(f) of the Exploration and Production Regulations.
[25] Regulation 2(f) of the Exploration and Production Regulations.

registry of wells, activities and impacts. Without immediate public notification communities may unknowingly use contaminated water, biodiversity impacts may go unrecorded, and broadly, accountability is weakened. NEMA emphasises transparency, participation and access to environmental information as core governance principles. The Regulations appear technical and operational, but do not embed these principles structurally.

Inadequate State oversight

22. The regulatory structure appears to rely heavily on operator-generated information and internal reporting to authorities. This creates risks of under-reporting, data bias, weak enforcement and regulatory capture.

23. The Regulations provide for instances where fracturing right holders are required to submit certain monitoring results to the State bodies (being the competent authority, the designated agency and the Minister responsible for water and sanitation), but the Regulations are silent on what these bodies are required to do with these reports. For example –

    23.1. Regulations 8(12) and 8(17) require holders of fracturing exploration and production rights to provide the competent authority, delegated agency, and the Minister responsible for water and sanitation with monitoring results in accordance with the integrated operational monitoring plan for all identified environmental themes during exploration and production operations. However, the Regulations do not require these bodies to approve, or even consider, the monitoring results and/or reports.

    23.2. Regulation 14(3)(d) requires rights holders to keep a well file, including well pressure test results. Regulation 16(1)(c) requires holders to submit the well file to the delegated agency monthly, but there is no obligation on the delegated agency to review or consider the well file or the well pressure test results. Nor is there an obligation to act, should a risk or harm become apparent.

    23.3. In the context of the Regulation 21(1)(f) duty on right holders to monitor decommissioned wells in compliance with the final rehabilitation, decommissioning and closure plan, Regulation 21(1)(g) requires right holders to submit quarterly monitoring results to the designated agency and the Minister responsible for water and sanitation (unless there are identified anomalies, spikes or exceedances of requirements). However, for both the standard quarterly reporting and the reporting of anomalies no duty is imposed on the designated agency or Minister responsible for water and sanitation to act in response to these reports, which is particularly concerning in the case of anomalies which need urgent action.

24. In this way, the Regulations require the State bodies to do little more than passively receive important monitoring records from right holders. We submit that without providing for clear corresponding oversight and enforcement duties on the State bodies, and absent other forms of transparency, the duty imposed on the right holders to provide the monitoring results to these bodies is made meaningless. In essence, it means that, when it comes to monitoring, right holders are doing so without oversight and effective regulation.

25. Accordingly, to ensure accountability and public safety, the State bodies must be required to review, consider and act on the monitoring results when needed.

The Regulations do not provide for a centralised database for records

26. Regulation 20(1) of the Exploration and Production Regulations requires right holders to upload all their monitoring and reporting information, as well as information on the risk of the chemicals and additives in the fracturing fluid used in their operations, on their publicly accessible website.

27. While this is a welcomed provision, it requires the public to first know who a particular right holder is, and then to find these monitoring records on their website (which could be buried, mislabelled, etc.). In addition, where it is not available on their website, it would then be up to the individual to enforce the Regulations, an untenable and obstructive approach to transparency and access to information. The Regulations fall short of the Constitutional and NEMA principles listed above requiring access to information, environmental awareness and public participation. To give effect to these principles, and to encourage transparency, access to information and accountability, the Regulations must also require a centralised database of this information on the DFFE and/or designated agency's website. The relevant information should already be in the possession of the State as per the Regulations.[26]

B. Incorrect authority cited

28. The Regulations assign the role of "designated agency" to the Petroleum Agency of South Africa ("**PASA**").[27] The designated agency has various responsibilities under the Regulations that require it to approve, *inter alia*, monitoring reports, applications, well design, etc.,[28] and to review remedial actions following the immediate suspension of fracturing operations, including because operations pose a risk to the environment.[29] It essentially provides the oversight and monitoring role in the Regulations, and in doing so is supposed to protect the environment and people. It is evident that the Regulations give the designated agency a critical role in the administration of the Regulations, including in halting environmentally risky fracking operations and allowing recommencement of fracking after remedial actions, and in ensuring the integrity of wells.

29. However, PASA is also the designated agency under the MPRDA, which mandates PASA to "promote onshore and offshore exploration for and production of petroleum".[30] The Upstream Petroleum Resources Development Act[31] ("**UPRDA**") will, upon its commencement, repeal PASA's mandate under the MPRDA. It similarly mandates PASA to "ensure optimal levels of recovery of petroleum resources".[32]

30. In terms of the principle of sustainable development, there is a tension between PASA's mandate under the MPRDA and UPRDA, and its mandate under the Regulations. Sustainable development is not mentioned in the Exploration and Production Regulations, but it is a principle of its empowering legislation, NEMA,[33] and environmental law generally. It requires consideration of factors including that the use and exploitation of non-renewable natural resources is "responsible and equitable"[34] and

[26] Regulations 8(12), 8(17), 16(1)(c) and 21(1)(g).
[27] Exploration and Production Regulations, Regulation 1. In terms of section 70 of the Mineral and Petroleum Resources Development Act, this is the Petroleum Agency of South Africa.
[28] Exploration and Production Regulations, such as Regulation 8(12) read with Regulation 8(7); Regulation 9(2); Regulation 15(1)(b); Regulation 15(1)(c); Regulation 17(1); and Regulation 16(1).
[29] Exploration and Production Regulations, Regulation 18(5).
[30] Section 71(a) of the MPRDA.
[31] Act 23 of 2024.
[32] Section 10(d) of the UPRDA.
[33] Section 2(4)(a) of NEMA.
[34] Section 2(4)(a)(v) of NEMA.

that "a risk-averse and cautious approach is applied"[35]. The Court in *Fuel Retailers*[36] used it as a principle for the resolution of tensions between the need to protect the environment on the one hand, and the need for socio-economic development on the other hand.[37]

31. PASA's mandate under the MPRDA and the UPRDA respectively is to "promote" and "optimise" the recovery of petroleum resources. This in conflict with environmental duties imposed on the designated agency under the Regulations' empowering act, NEMA.

32. The High Court found, in relation to earlier iterations of the Regulations, that-

> "*the dominant purpose and effect of the [fracking] regulations is to regulate the process and requirements of applications for environmental authorisations and to establish a regulatory framework and norms and standards for the management of the environmental risks of petroleum exploration and production*."[38]

33. This purpose is in direct conflict with PASA's mandate under the MPRDA and UPRDA. A designated agency should be an entity within the DFFE or an impartial entity that is not incentivised to promote oil and gas production. We therefore submit that making PASA the designated agency is a fatal flaw in the Regulations that makes them unfit for purpose.

C. Technology omission

34. The Exploration and Production Regulations are preceded by a 2022 iteration of same entitled the "Proposed Regulations Pertaining to the Exploration and Production of Onshore Oil and Gas Requiring Hydraulic Fracturing" ("**2022 Regulations**"). The Regulations are a revised version '*reflect[ing] the incorporation of amendments made based on the first call for public comment'*.[39]

35. As its title suggests, the 2022 Regulations regulated hydraulic fracturing, which it defined in the 2022 Regulations as-

> '*a well stimulation technique in which rock is fractured by a pressurized liquid or gas, which process involves the high-pressure injection of fracturing fluids or gas into a wellbore to create microfractures or fractures in the deep-rock formations through which natural gas, petroleum and brine will flow more freely*.'[40]

36. By contrast, the current iteration of the Regulations appears to regulate fracturing methods and technology which are broader than hydraulic fracturing, to include non-hydraulic fracturing. The Exploration and Production Regulations define "fracturing" as-

[35] Section 2(4)(a)(vii) of NEMA.
[36] *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province and Others* [2007] ZACC 13.
[37] *Fuel Retailers* at para 57.
[38] *Minister of Mineral Resources v Stern and Others; Treasure the Karoo Action Group and Another v Department of Mineral Resources and Others* [2019] ZASCA 99 at para 38.
[39] Government Gazette 53637 under Government Notice 6806 dated 7 November 2025 at page 16.
[40] Regulation 1 of the 2022 Exploration and Production Regulations.

'*an intervention performed on a well to increase production by improving the flow of petroleum from the drainage area into the well bore and includes re-fracturing*'[41]

37. This broad definition contains no reference to the use of a specific substance or method in the fracturing process. The impacts of the different technologies and methods are significant in different ways, not least of all on water use.

38. Despite the definition in the Regulations being so vague as to encompass all technology and methods, the Regulations do not regulate non-hydraulic technology but rather cater for only hydraulic technology. In order to comment on non-hydraulic technology, the public needs to be given sufficient information. We therefore object to the overly broad definition coupled with the seeming regulation of only hydraulic fracturing.

39. We, therefore, submit that the Regulations must clarify that they only regulate hydraulic fracturing. Alternatively, the Regulations must robustly regulate non-hydraulic fracturing technology and make such changes available for public comment.

D. Water ecosystems

40. This section addresses water ecosystems, including surface water, groundwater, groundwater-dependent ecosystems ("**GDEs**")[42], wetlands, springs, ephemeral rivers, and the ecological integrity of hydrological systems as a whole.

41. While the Regulations do not apply specifically or exclusively to the Karoo, it is well understood that this is likely the primary site for fracturing activities. Therefore, one would expect some Karoo-specific hydrogeological modelling or ecosystem-level risk assessment, particularly due to extensive scientific warnings from South African research institutions. This includes stating that Karoo geology is characterised by:

    41.1. Dolerite dykes and sills acting as preferential pathways;

    41.2. Fractured aquifers;

    41.3. Artesian and semi-confined groundwater systems;

    41.4. Strong groundwater dependence of surface ecosystems.

42. This should inform and form part of the Regulations. Law cannot be made in the abstract.

43. Our objections to the Regulations in terms of water ecosystems are grounded in:

    43.1. The Constitution[43];

[41] Regulation 1 of the Exploration and Production Regulations.
[42] Groundwater-Dependent Ecosystems ("GDEs") in South Africa are crucial natural systems like springs, wetlands, riparian zones, and specialised vegetation (e.g., *Acacia erioloba*) that rely on groundwater for survival, providing vital biodiversity and water security, especially in arid regions. Key examples include Table Mountain Group springs, Kalahari oases, and Kruger National Park's dry season habitats, but they face threats from abstraction, climate change, and invasive species, necessitating advanced mapping and integrated management. See https://gwd.org.za/abstract/groundwater-dependent-ecosystems-table-mountain-group-sandstones-and-potential-impact#:~:text=These%20ecosystems%20include%20many%20specialised,resource%20and%20land%20management%20agencies.
[43] Constitution of the Republic of South Africa Act 108 of 1996.

43.2. NEMA;

43.3. The National Water Act ("**NWA**")[44];

43.4. Constitutional Court, Supreme Court of Appeal and High Court jurisprudence; and

43.5. Peer-reviewed and institutional scientific evidence.

44. In terms of this legal framework, water ecosystems are a legally protected interest or a protected entity, not merely water supply inputs. In particular:

44.1. Section 24 of the Constitution protects ecological systems and biodiversity;[45]

44.2. Section 2(4)(r) of NEMA requires ecosystems to be protected as an integral part of sustainable development;[46]

44.3. Sections 2[47] and 3[48] of the NWA establish the State as public trustee of water resources and impose a strict duty to prevent ecological degradation, promote biodiversity and ensure that water is used for the public benefit (i.e. not for profit) in a way that ensures that sustainability of the water ecosystem; and

44.4. Sections 16-18 of the NWA render the Ecological Reserve (also called the Reserve) a binding legal constraint, not a discretionary policy consideration (any regulatory scheme that permits activities likely to impair water ecosystems without first determining, protecting and enforcing the Ecological Reserve is *per se* unlawful).

45. What follows are particular aspects of the Regulations where it falls short of legal obligations as they relate to water ecosystems.

Narrow framing of water impacts is unlawful

46. We submit that the narrow framing of water impacts (Regulations 4(a), 4(c), Appendix 4) is unlawful. The Regulations reduce water protection to abstraction volumes, chemical discharge limits, and infrastructure-based buffers. This framing unlawfully excludes ecosystem functioning, including:

[44] National Water Act 36 of 1998.
[45] Section 24: Everyone has the right (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
i. prevent pollution and ecological degradation;
ii. promote conservation; and
iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.
[46] Section 2(4)(r): Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands. and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.
[47] Section 2: Purpose of Act.—The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors—
(a) meeting the basic human needs of present and future generations;
(d) promoting the efficient, sustainable and beneficial use of water in the public interest;
(e) facilitating social and economic development;
(f) providing for growing demand for water use;
(g) protecting aquatic and associated ecosystems and their biological diversity;
(h) reducing and preventing pollution and degradation of water resources;
(k) managing floods and droughts,
[48] Section 3: Public trusteeship of nation's water resources.—(1) As the public trustee of the nation's water resources the National Government, acting through the Minister, must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all persons and in accordance with its constitutional mandate.
(2) Without limiting subsection (1), the Minister is ultimately responsible to ensure that water is allocated equitably and used beneficially in the public interest, while promoting environmental values.

46.1. Groundwater-surface water connectivity;

46.2. Baseflow contributions to rivers;

46.3. Ecological flow requirements; and

46.4. Biological integrity of aquatic systems.

47. Compliance with numerical water-quality limits that does not equate to protection of water ecosystems, is unlawful. There must be substantive protection (see *Minister of Environmental Affairs v The Trustees for the time being of Groundwork Trust and Others*[49]).

48. There is inadequate protection of GDEs (in particular, see Regulations 5(f), (g), and (i); 6(1)(a); and 8(9), and (14)). The Regulations fail to identify, map or protect GDEs, despite their recognised vulnerability in South African water science and policy. Buffer distances (for example, 5 km from springs or wellfields) are applied arbitrarily, without required hydrogeological delineation of contributing aquifers, determination of ecological thresholds, and an assessment of drawdown-related ecological collapse.

49. This omission, and consequent limitation, constitutes a failure to consider relevant considerations under section 24O of NEMA and section 27 of the NWA, rendering any authorisation reviewable.

50. Scientific evidence demonstrates that pressure changes and abstraction associated with fracking can reduce spring discharge and wetland viability even without detectable contamination, leading to ecosystem failure.[50]

51. This failure to address flow-related and pressure-related impacts (Regulations 4(a) and (g); and 7(a)–(d)) will undoubtedly lead to significant environmental harm, including the compromising of water ecosystems, upon which life is dependent. The Regulations focus almost exclusively on contamination risk, ignoring flow-related impacts that are equally ecologically destructive. Under definition of "pollution" in the NWA, any activity that alters the physical and/or biological property of a water resource, such as changes to flow regimes or a reduction of baseflow, constitutes pollution and therefore ecological degradation, irrespective of water quality. In other words, pollution includes chemical contamination but also includes physical and biological alterations that occur during and after fracturing processes. This is not provided for under the Regulations. Scientific literature confirms that small changes in groundwater pressure and discharge can trigger disproportionate ecological impacts in arid and semi-arid ecosystems.[51]

52. Wetlands and ephemeral rivers are explicitly protected as watercourses[52] under the NWA, yet receive no specific protection in the Regulations.[53] These systems are highly sensitive to, *inter alia*, groundwater level decline, salinity increases, and hydrocarbon and radionuclide contamination. The failure to address these risks renders the Regulations irrational and inconsistent with constitutional and legislative environmental obligations.

[49] *Minister of Environmental Affairs v The Trustees for the time being of Groundwork Trust and Others* (549/2023) [2025] ZASCA 43 (11 April 2025).
[50] See https://link.springer.com/article/10.1007/s42452-025-07122-x.
[51] See https://seasgd.csir.co.za/wp-content/uploads/2017/06/SGD-Scientific-Assessment-Binder1_LOW-RES_INCL-ADDENDA_2nd-Edition_05June2017.pdf, at page 5-36.
[52] A "water resource" includes a watercourse, surface water, estuary, or aquifer according to the NWA.
[53] In particular, see Regulations 5-8.

53. The Regulations fail to protect water ecosystems (aquatic and GDEs)[54] as required by the Constitution, NEMA and the NWA. The Regulations consistently frame water impacts in terms of "water quality" and "water use" but fail to recognise and protect water ecosystems as legally distinct and independently protected environmental components. This omission is inconsistent with:

53.1. Section 24 of the Constitution, which protects ecological systems;

53.2. Section 2(4)(r) of NEMA, which requires the protection of ecosystems and biodiversity;

53.3. Sections 2(g) and (h), 3 and 19 of the NWA, which recognise aquatic ecosystems as the foundation of the water resource and impose a duty to prevent pollution and ecological degradation; and

53.4. The legally binding concept of the Ecological Reserve under sections 16-18 of the NWA.

54. By failing to require explicit assessment of impacts on aquatic ecosystems (including groundwater-dependent ecosystems, springs, wetlands, and river baseflows), the Regulations are unlawful and materially incomplete.[55]

55. Crucially, the Regulations fail to determine and enforce the Ecological Reserve, instead relying on an arbitrary 400ml of rainfall per annum.[56] Alternating wet and dry cycles are well established for the Karoo region. As a result, monitoring of surface water flow, aquifer resources, discharge and recharge etc. for periods of less than a decade is potentially meaningless. This applies equally to monitoring post-drilling and post-fracking, especially as monitoring is likely to be largely restricted to surface water flow and near-surface aquifers as indicators of all sub-surface impact.[57]

56. The Regulations do not require prior determination of the Ecological Reserve for affected water resources, nor do they prohibit authorisation where Reserve compliance cannot be demonstrated. This omission is fatal. Authorising activities without ensuring Reserve protection is unlawful and inconsistent with the public trusteeship duties under the NWA (as well as the constitutional right in terms of section 24).

Inadequate protection in terms of water abstraction

57. Fracturing requires large volumes of water for drilling, dust suppression, cleaning and worker needs. In the Karoo and other arid or semi-arid landscapes, this will likely come from groundwater abstraction (it cannot be assumed that importing water will be viable, sustainable or implemented). Reduced groundwater may diminish or eliminate flows to springs, wetlands and ephemeral rivers, degrading aquatic and riparian habitats. In turn, falling water tables may alter chemistry, increase salinity and concentrate pollutants, compounded by possible crossflow between formations if geological barriers or well casings fail, allowing contaminants to enter freshwater aquifers. Groundwater impacts may appear decades later and extend far beyond drilling sites, including through flowback water which can contain salts, heavy metals, radioactive materials and hydrocarbons, posing contamination risks to water resources.

[54] In particular, see Regulations 2(a), (d), (e) read with Regulations 4, 5, 6, 7 and 8.
[55] *Minister of Water Affairs and Forestry v Stilfontein Gold Mining Co Ltd* 2006 (5) SA 333 (W), confirming strict duties to prevent pollution of water resources, including ecological components.
[56] In particular, see Regulations 2, 5, 6, 7 and 8.
[57] Peter Carrick, Biodiversity opinion (2026), page 9, attached to this submission.

58. As discussed above, the Regulations prohibit the abstraction of water '*except from deep saline aquifers, for any purpose in the exploration or production operation other than for drinking, domestic use or the preparation of slurry for cement mixtures on which tests will be conducted*' in areas where the annual rainfall is less than 400 mm.[58] ("**Partial Abstraction Prohibition**")

59. It was recently recorded that in the face of South Africa's rapidly increasing population,[59] the country is increasingly water-scarce and is ranked 30th driest in the world. This is based on South Africa's average rainfall of 500 mm compared to the world average of 860 mm.[60] Additionally, climate change experts predict that climate change with exacerbate this, with increased dryness in the west of South Africa,[61] and more extended and severe droughts,[62] as well as extreme weather events.[63] The Partial Abstraction Prohibition only permits water abstraction for fracking operations in limited areas depending on their annual rainfall (which areas will likely be further limited in future due to climate change impacts).

60. In her expert opinion Dr Surina Esterhuyse states that the arid Nama-Karoo receives receives between 160 mm rainfall per annum in the west and 4000 mm in the east, which rainfall is highly variable, with some years having significant rainfall and some less, and with some regions of the Karoo receiving intense rains in a given rainfall season, and some little rain, indicating large spatio-temporal variability. Dr Esterhuyse's report is attached as "**Annexure A**".

61. Scientific literature has found links between water abstraction and aquatic biodiversity that require certain patterns of water levels and flows through the year.[64] Hydrological changes, including the withdrawal of surface waters presumably affects the hydropatterns of streams, floodplains, wetlands, intermittent pools, springs, seeps, shallow groundwater, and karst complexes.[65] These changes in turn affect aquatic biodiversity as reduced flows may also decrease dissolved oxygen, increase deposition of fine sediment, and increase water temperatures, causing macroinvertebrate species richness to decrease and community composition to shift toward forms tolerant of these conditions.[66]

62. The sole basis of the Partial Abstraction Prohibition applying to an area is the amount of annual rainfall. It is unclear why the limit is set at 400 mm of rainfall and why the determination is annual. Further, the boundaries of an area are not defined. In so doing, the Partial Abstraction Prohibition fails to meaningfully give effect to the Regulations' purpose of '*identify[ing] geographical areas in which exploration or production operations for onshore petroleum requiring the use of fracturing technology are prohibited'*.[67] Even if the boundaries were defined, water systems do not adhere to human-made boundaries. This is not how water scarcity is measured. The Partial Abstraction Prohibition provision is therefore arbitrary and unlawful.

63. The Partial Abstraction Prohibition being based on annual rainfall fails to consider the Reserve in terms of the NWA. The Reserve determines how much of the area's water resources are already required to protect these resources' aquatic ecosystems, and how much of these resources already provides

[58] Exploration and Production Regulations at Regulation 4(a).
[59] South Africa Yearbook 2023/24 31st edition "Water and Sanitation" at page 2. See https://www.gcis.gov.za/resources/south-africa-yearbook-202324.
[60] South Africa Yearbook 2023/24 31st edition "Water and Sanitation" at page 2. See https://www.gcis.gov.za/resources/south-africa-yearbook-202324.
[61] 2025 NBA at page 28.
[62] 2025 NBA at page 9.
[63] 2025 NBA at page 9.
[64] See E, Kiviat (2013) 'Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales' Annals of the New York Academy of Sciences at page 5.
[65] See E, Kiviat (2013) 'Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales' Annals of the New York Academy of Sciences at page 5.
[66] See E, Kiviat (2013) 'Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales' Annals of the New York Academy of Sciences at page 5.
[67] Regulation 2(c) of the Exploration and Production Regulations.

for the essential needs of people that they serve.[68] This is why, as stated above, the Exploration and Production Regulations should require the determinations of the Reserve where fracking operations are proposed. By not considering the Reserve of an area's water resources, the Partial Abstraction Prohibition fails to address how water abstraction for fracking operations will impact water ecosystems and water security for people's existing essential needs. It is therefore unlawful.

Inadequate protection of groundwater resources

64. Related to a failure to determine and enforce the Ecological Reserve, GDEs are also inadequately protected.[69] The Regulations treat springs, municipal wellfields and groundwater primarily as water supply infrastructure, rather than as ecological systems. This approach ignores GDEs, which are recognised in South African water law and policy as requiring protection irrespective of human abstraction.

65. Regulation 4 permits abstraction from deep saline aquifers in low-rainfall areas (<400 mm/annum). This is inconsistent with the NWA, which recognises all groundwater as part of an interconnected hydrological cycle subject to public trusteeship (see above). The Regulations impermissibly assume hydraulic isolation between deep saline aquifers and usable groundwater, without requiring proof to the standard demanded by section 24O of NEMA or section 19 of the NWA. To the contrary, hydrogeological science does not support a blanket assumption of isolation. Evidence demonstrates vertical and lateral connectivity through:[70]

    65.1. Faults and dolerite dykes common in Karoo geology;

    65.2. Poorly cemented or legacy wells acting as conduits;

    65.3. Pressure-driven migration over time.

66. Shale gas development introduces several pathways through which toxic substances could contaminate groundwater systems. Shale gas operations rely on engineering and regulatory controls to preserve this separation. To be effective these permanent isolation barriers will need to remain in place and intact for centuries, at a minimum.[71] If geological or engineered barriers fail, specific risks include:

    66.1. loss of hydrocarbon containment from hydrocarbon bearing formations previously not in communication with the surface environment; and

    66.2. transfer of fluids between formations (crossflow) resulting in unnatural pressurisation or contamination of formations, including freshwater aquifers.

67. The ephemeral rivers of the Karoo are highly dependent on groundwater discharge, which occurs at springs and when groundwater recharges. These are especially vulnerable to pollutant, toxin and saline accumulation,[72] present during fracturing.

68. The Regulations also prescribe arbitrary and scientifically unsupported buffer distances (Regulations 5(f)–(i), 6(1)(a) and 6(2)). Buffer zones are useful dependant on the water resource and the

[68] See Chapter 3 Part 3 of the NWA.
[69] In particular, see Regulations 4-7, 17 and Appendixes 2 and 4.
[70] See for example: Council for Scientific and Industrial Research (CSIR) (2016) *Hydraulic Fracturing in the Karoo: Critical Review*; Warner et al. (2012) *Geochemical Evidence for Possible Natural Migration of Methane*, PNAS.
[71] Peter Carrick, Biodiversity opinion (2026), page 7, attached to this submission.
[72] Peter Carrick, Biodiversity opinion (2026), page 7, attached to this submission.

environment it is found in but can do little to address some impacts such as hydrological changes caused by stream flow reduction activities or changes in flow brought about by abstractions or upstream impoundments. Buffer zones are also not the appropriate tool for militating against point-source discharges, which can be more effectively managed by targeting these areas through specific source-directed controls. Contamination or use of groundwater is also not well addressed by buffer zones and requires complementary approaches such as controlling activities in sensitive groundwater zones.[73]

69. The fixed buffer distances (for example, 5 km from towns, springs, wellfields) are arbitrary and lack a rational scientific basis, rendering them susceptible to review under the principle of rationality.[74] International evidence shows contamination pathways can extend beyond 5 km through:[75]

    69.1. Regional aquifer flow systems;

    69.2. Airborne pathways (volatile organic compounds);

    69.3. Induced seismic events propagating beyond immediate operational areas.

70. Regulation 6(2) further allows derogation from a prohibition based on mitigation, undermining the protective purpose of buffers and amounting to an unlawful delegation of core policy decisions.

71. Further, buffer distances (for example, 5 km from springs and wellfields) are applied without:

    71.1. Identification and mapping of GDEs;

    71.2. Determination of ecological flow requirements;

    71.3. Consideration of drawdown impacts on dependent surface ecosystems.

72. This is inconsistent with section 24O(1)(b) of NEMA and section 27(1)(c) of the NWA, which require consideration of impacts on the water resource as a whole. Scientific studies show that:[76]

    72.1. Many springs and wetlands in semi-arid regions are sustained by deep or regional groundwater systems;

    72.2. Pressure changes, abstraction, and induced fractures can reduce discharge to springs without detectable contamination;

    72.3. Ecological collapse can occur due to reduced flow alone.

73. The prescribed baseline monitoring period (24-month baseline monitoring) is scientifically inadequate (Regulation 8(5)). A minimum baseline monitoring period of 24 months is arbitrary and inconsistent with NEMA section 24O, which requires decision-makers to consider all relevant factors, including long-term variability. The prescribed minimum 24-month baseline monitoring period is arbitrary and inadequate for semi-arid groundwater systems characterised by high inter-annual variability.

74. Critically, baseline monitoring excludes:

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[73] Macfarlane et al. (2014) *Preliminary guideline for the determination of buffer zones for rivers, wetlands and estuaries*, Water Research Commission, available at https://www.wrc.org.za/wp-content/uploads/mdocs/TT%20610-1-14.pdf.
[74] *Democratic Alliance v President of South Africa* 2013 (1) SA 248 (CC).
[75] See for example, British Geological Survey (2014) *Hydrogeological Risks of Shale Gas Extraction* (available at https://www.bgs.ac.uk/geology-projects/shale-gas/bgs-shale-gas-research/).
[76] See for example, Department of Water and Sanitation (2016) *Groundwater Strategy*; Department of Water and Sanitation (2022) *National Water Resources Strategy 3*; Eamus et al. (2016) *Groundwater Dependent Ecosystems: Classification, Identification Techniques and Threats* (in book: *Integrated Groundwater Management*).

74.1. Aquatic biota;

74.2. Ecosystem processes;

74.3. Hydro-ecological connectivity.

75. Our courts have held that incomplete information vitiates environmental authorisation.[77] Hydrochemical and isotopic baselines require multi-year datasets to account for climatic variability, particularly in semi-arid systems like the Karoo. Short baselines risk false attribution or failure to detect impacts.[78] A baseline incapable of detecting ecosystem degradation cannot lawfully support environmental authorisation.

76. Absence of cumulative impact assessment (including Regulations 7 and 8). While impacts are addressed on a project basis, the Regulations fail to mandate cumulative impact assessments. This omission is inconsistent with jurisprudence recognising cumulative impacts as legally mandatory.[79]

77. Cumulative effects of multiple wells include:

77.1. Regional drawdown of groundwater;

77.2. Landscape fragmentation;

77.3. Incremental seismic risk.

78. These cannot be meaningfully assessed at single-well scale. Therefore, the proposed Regulations as they stand are unlawful.

Failure to give effect to the Precautionary Principle[80]

79. Regulation 2 purports to give effect to environmental protection, yet the regulatory scheme as a whole does not adequately operationalise the precautionary principle entrenched in section 2(4)(a)(vii) of NEMA. The precautionary principle requires a risk-averse and cautious approach where there is scientific uncertainty regarding serious or irreversible harm. South African courts have repeatedly affirmed that the precautionary principle is not discretionary.[81]

80. The Regulations permit fracturing subject to mitigation measures, notwithstanding substantial scientific uncertainty regarding long-term groundwater contamination, induced seismicity, and cumulative impacts. This is inconsistent with binding constitutional and statutory obligations.

81. This uncertainty is particularly pronounced in peer-reviewed literature which confirms unresolved uncertainty regarding, *inter alia*:[82]

[77] *Earthlife Africa Johannesburg v Minister of Environmental Affairs* [2017] 2 All SA 519 (GP).
[78] See for example, Edmunds et al. (1987) *Baseline geochemical conditions in the Chalk aquifer, Berkshire, U.K.: a basis for groundwater quality management,* Applied Geochemistry, available at https://www.sciencedirect.com/science/article/abs/pii/0883292787900424; Council for Scientific and Industrial Research (CSIR) (2016) *Hydraulic Fracturing in the Karoo: Critical Review*.
[79] *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management* 2007 (6) SA 4 (CC); see also *Earthlife Africa Johannesburg v Minister of Environmental Affairs* [2017] 2 All SA 519 (GP).
[80] See Regulation 2, read with Regulations 4-7, and 17; Appendixes 2 and 4.
[81] *Fuel Retailers Association of Southern Africa v Director-General, Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province* 2007 (6) SA 4 (CC). See also *HTF Developers v Minister of Environmental Affairs and Tourism and Others* (337/06) 2007 (5) SA 438 (SCA).
[82] See for example, US Environmental Protection Agency (2016) *Hydraulic Fracturing for Oil and Gas: Impacts on Drinking Water Resources*; Jackson et al. (2014) *The Environmental Costs and Benefits of Fracking, Annual Review of Environment and Resources*.

81.1. Migration of methane and fracking fluids through legacy faults and well integrity failures;

81.2. Delayed contamination of aquifers decades after well closure; and

81.3. Low-probability, high-impact seismic events.

82. These uncertainties trigger a heightened precautionary threshold, which the Regulations fail to meet.

83. These are in addition to issues relating, *inter alia*, to contamination of aquifers and wells, transportation-associated leaks, water use in water scarce areas and the impact on the Reserve and surrounding communities.

84. Scientific uncertainty regarding fracking impacts on groundwater systems, induced fractures, delayed contamination pathways, and pressure-related flow changes is substantial and well-documented. This uncertainty triggers a heightened duty of caution, not a permissive regulatory approach. The Constitutional Court has confirmed that environmental decision-making must err on the side of environmental protection where uncertainty exists.[83]

85. The Regulations instead assume impacts can be mitigated through monitoring and post-facto management. This approach is incompatible with the precautionary principle, especially where harm to water ecosystems may be irreversible. This is particularly heightened in Regulation 16(e), which provides for testing at the target site before the following basic information is provided to the designated agency and Minister responsible for water affairs:

85.1. type and volumes of water sources for fracturing operations;

85.2. volumes and rates of fracturing fluid pumped into the target zone; and

85.3. volumes and release of flowback received during and after each fracturing event.

86. This clearly provides for a "do first, check later" approach, which is fundamentally at odds with a precautionary and risk-adverse approach required by the law. Therefore, as they stand, the Regulations are unlawful.

Deemed approval provisions are unlawful[84]

87. It is unclear whether the deemed approval in Regulation 19(2) is deemed after 5 or 10 days in terms of the timeline in Regulation 19(1). Even if one assumes the more generous interpretation of 10 days, the deemed approval mechanism, whereby concurrence of the Minister responsible for water affairs is presumed if no response is received within 10 days, is unlawful. It undermines the constitutional duty to protect water resources, the trusteeship in terms of which the State is custodian of water resources, as well as the statutory duties under the NWA and NEMA. The Minister responsible for water affairs is required to make decisions that impact water resources and that involve Water Use Licences. This is not a power that can be removed through subordinate regulations and therefore unlawfully usurps the powers of the Minister responsible for water affairs.

88. In addition, this Regulation violates the principle that environmental authorisations require active application of mind, both by the designated authority (5 days to consider an application is far too short)

[83] *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management* 2007 (6) SA 4 (CC).
[84] See Regulations 19(1) and (2).

and the Minister responsible for water affairs (5 to 10 days is also too short). These applications are often lengthy and technical.

89. Further, the wording of Regulation 19(1)[85] suggests that the designated agency can only approve the application or request additional information. It does so without the option of rejecting the application outright. Regulation 19(2) also suggests that if an approval or request for additional information is not given within the stipulated time then it is a deemed approval.[86] If there is only the option to approve an application, this is irrational and an unlawful curtailment of the designated agency's and the Minister responsible for water affairs' decision-making power.

90. Comparable provisions have been struck down where they circumvent decision-making powers.[87]

91. It is also worth noting that the provisions *requiring* the concurrence of the Minister responsible for water affairs are unclear in terms of what provisions and/or processes are implicated under the NWA, and that the Regulations do not in fact speak to the NWA despite the overlap in terms of the need to protect water resources (both in terms of use and impact).

92. The above is clearly unlawful, resulting in the proposed Regulations being unlawful.

Disclosure of chemicals is insufficient[88]

93. While Regulation 20 requires disclosure, it only requires the disclosure of trade names and their general purposes. An assessment of risk requires full chemical disclosure, including degradation products and synergistic effects, which are not addressed.[89] Therefore, Regulation 20 excludes key elements that are needed in order to understand the importance of these chemicals, namely:

    93.1. The secondary substances that the original chemical breaks down into as it ages, reacts with light, water, air, or biological processes. These breakdown products can sometimes be more hazardous than the parent chemical itself and must also be evaluated.

    93.2. The interaction between two or more chemicals that results in a combined effect greater than the sum of their individual effects (for example, A + B result in C, where C is much more dangerous than A and B separately). These interactions need to be understood and disclosed.

94. Therefore, the individual chemicals will behave differently when introduced to water, and/or pressure, and/or heat, etc. These need to be understood and disclosed in order to protect the environment, water ecosystems and peoples' health (fundamental to section 24 of the Constitution).

95. Moreover, while wastewater impacts could be reduced by avoiding open storage ponds and using closed, leak-proof systems with stringent treatment and monitoring and engineering controls (e.g., isolation barriers) are intended to maintain separation between formations, their long-term reliability (they would need to be in place over centuries) is uncertain.

[85] Regulation 19(1): "The designated agency **must** provide approvals or request additional information…".
[86] Regulation 19(2): 'Where the concurrence of the Minister responsible for water affairs is required and not provided within the timeframe contemplated in subregulation (1), **it will be deemed that approval is given**;'.
[87] *Democratic Alliance v Minister of Co-operative Governance and Traditional Affairs* 2024 (5) SA 463 (SCA) (30 April 2024); *Minister of Finance v Afribusiness* NCP 2022 (4) SA 362 (CC).
[88] See Regulation 20.
[89] Faber (2024) *Chemical risk assessment of hydraulic fracturing in relation to water resources*. [Thesis, fully internal, Universiteit van Amsterdam], available at https://pure.uva.nl/ws/files/178548558/Thesis.pdf. See also Haswell *Submission to the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory*, available at https://frackinginquiry.nt.gov.au/?a=424231.

96. Consequently, the Regulations as they stand are unlawful.

E. Aquatic biodiversity

97. Fracturing will impact aquatic biodiversity, as evidenced by its mention in the Minimum Information Requirements Regulations, for example. The Karoo, although arid, is characterised by ephemeral aquatic ecosystems[90] that are expected to be impacted by fracturing operations including by groundwater drawdown,[91] impacting these ecosystems and the organisms that depend on them.

98. NEMA provides that microorganisms, plant and animal life form part of the environment, and that ecosystems are '*system[s] of plant, animal and microorganism communities and their non-living environment interacting as a functional unit*'.[92] It follows that the constitutional and legislative principles and protections for the environment and water ecosystems listed in the section above are relevant to their aquatic biodiversity, including the State duty under the NWA to ensure that the nation's water resources are protected, used, conserved, managed and controlled in a manner that takes into consideration the protection of aquatic and associated ecosystems and their biological diversity.[93]

99. In addition to those provisions, protections specific to aquatic biodiversity are found firstly in the National Environmental Management: Biodiversity Act 10 of 2004 ("**NEMBA**") and secondly in the CBD to which South Africa is a party, and which is incorporated into our domestic law.[94]

100. First, NEMBA's objectives include providing for –

    100.1. the management and conservation of biodiversity and of its components;[95]

    100.2. the need to protect the ecosystem as a whole, including species not targeted for exploitation;[96]

    100.3. the consideration of animals' wellbeing in their management, conservation and sustainable use;[97] and

    100.4. cooperative governance in biodiversity management and conservation.[98]

101. Accordingly, NEMBA requires the State to manage, conserve and sustain South Africa's biodiversity, and links this duty with the State's fulfilment of the constitutional environmental rights.[99]

102. Under its NEMBA mandate, the South African National Biodiversity Institute ("**SANBI"**) produced the 2025 National Biodiversity Assessment ("**2025 NBA**"). The 2025 NBA is '*the primary tool for monitoring and reporting on the state of biodiversity in South Africa*.'[100] The 2025 NBA makes the following findings:

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[90] 2016 CSIR Report at page 7-55 to 7-56.
[91] Van Deventer, H., Smith-Adao, L., Collins, N.B., Grenfell, M., Grundling, A., Grundling, P-L., Impson, D., Job, N., Lötter, M., Ollis, D., Petersen, C., Scherman, P., Sieben, E., Snaddon, K., Tererai, F. & Van der Colff, D. 2019. South African National Biodiversity Assessment 2018: Technical Report. Volume 2b: Inland Aquatic (Freshwater) Realm. CSIR report number CSIR/NRE/ECOS/IR/2019/0004/A. South African National Biodiversity Institute, Pretoria ("**2018 NBA Freshwater Technical Report**") at page 114.
[92] NEMA section 1 definitions of "environment" and "ecosystem".
[93] NWA section 2(g).
[94] See *Diedericks v MEC for Agriculture, Environmental Affairs, Rural Development and Land Reform (Northern Cape) and Another* [2025] ZANCHC 104 at para 42.
[95] NEMBA section 2(a)(i)
[96] NEMBA section 2(a)(iA),
[97] NEMBA section 2(a)(iiA)
[98] NEMBA section 2(c)
[99] NEMBA section 3(1)(a).
[100] 2025 NBA at page 64.

102.1. Despite estuaries, rivers and wetlands being '*essential ecological infrastructure for water security, food security tourism, recreation, spiritual and cultural services, as well as disaster risk reduction and carbon sequestration… [and] important havens for many threatened and endemic species*' South Africa's aquatic ecosystems are in a "dire status".[101] The 2025 NBA thus concludes that '*estuaries, rivers and wetlands are the most threatened and least protected ecosystems in South Africa.*'[102]

102.2. In relation to freshwater and estuarine ecosystems, a major pressure on aquatic biodiversity is habitat loss from mining and energy generation operations,[103] whose "intense, persistent and cumulative impacts" often extend beyond their direct footprint, especially in aquatic realms where impacts cannot be easily contained.[104] The 2025 NBA accordingly finds that '*action is urgently needed to better integrate biodiversity into spatial planning and decision-making at all levels of government and across all sectors.*'[105]

103. The dire status of these water ecosystems and their aquatic biodiversity, and the existing development pressures on them, trigger the State's NEMBA duty to conserve and sustain them, and the NEMA requirement that these ecosystems receive specific management attention in the Regulations,[106] which are issued under NEMA.

104. The 2025 NBA positions Freshwater Ecosystem Priority Areas ("**FEPAs**") as part of the solution for protecting and restoring freshwater ecosystems. FEPAs are defined as-

> *'strategic spatial priorities for conserving freshwater ecosystems and associated biodiversity, determined through a process of systematic biodiversity planning and identified using data on freshwater ecosystem types, species and ecological processes'*[107]

105. They are characterised as often being-

> *'tributaries and wetlands that support hard-working main rivers, and are an essential part of an equitable and sustainable water resource strategy [which] need to stay in a good condition to manage and conserve freshwater ecosystems, and to protect water resources for human use [and thus] should be supported by good planning, decision-making and management to ensure that human use does not impact on the condition of the ecosystem.*'[108]

106. The 2025 NBA states that FEPAs are being updated and will be an important strategic spatial plan to integrate and strengthen freshwater ecosystem and species-related planning and decision-making across government and civil society.[109] It follows that the protection of freshwater ecosystems and their aquatic biodiversity must be taken into account in both determining the desirability of fracturing as a method of extraction and, if deemed desirable, it requires stringent protection be afforded to FEPAs, including a prohibition of fracturing exploration and production in FEPAs.

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[101] 2025 NBA at page 44.
[102] 2025 NBA at page 44.
[103] 2025 NBA at page 30.
[104] 2025 NBA at page 30.
[105] 2025 NBA at page 30.
[106] NEMA section 2(4)(r).
[107] Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources. August 2011. WRC Report No. TT 500/11 at page 60.
[108] Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources. August 2011. WRC Report No. TT 500/11 at page 60.
[109] Van Der Colff, D., Raimondo, D.C., Job, N., Broom, C.J., Roux, F., Shelton, J., Milne, B., Dallas, H., Daniels, S., Liddle, N., Jordaan, M., Lee, A., Chakona, A., Hendricks, S.E., & Monyeki, M.S. 2025. Species status: Freshwater realm. National Biodiversity Assessment 2025. South African National Biodiversity Institute. https://nba.sanbi.org.za/content/species/fw_sp.html#protection-level

107. The second source of legal protections specific to aquatic biodiversity is the CBD, its provisions require South Africa to –

107.1. Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies[110]; and

107.2. As far as possible and as appropriate 'promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas.[111]

108. The CBD's preamble adopts the precautionary principle (also contained in NEMA), stating that-

> '*where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat.*'

109. The 2016 CSIR Report[112] states that the fracking activities of most concern from an aquatic ecological perspective are waste water management; water extraction and use; destruction of natural habitat in riparian areas and wetlands; construction and maintenance of roads that traverse watercourses or wetlands; and off-road driving through watercourses and wetlands.[113]

110. The 2016 CSIR Report discusses the presence of aquatic ecosystems and biodiversity in the arid Karoo, as well as some of the knowledge gaps, stating that –

110.1. '*The need for baseline monitoring to establish reliable baselines for the study area…is especially important given the large information gaps on many aspects of the biodiversity and ecology of the [Central Karoo]… and is particularly important in the ephemeral aquatic ecosystems which characterise the Karoo, as they have a high intrinsic variability in terms of aquatic community responses to inundation patterns'*;[114] and

110.2. '*our limited knowledge of the species that inhabit the aquatic ecosystems of the more arid parts of the [Central Karoo], their ranges, population sizes, and habitat requirements, is a constraint on the determination of the best aquatic indicator species*'.[115]

111. The threat of environmental harm of fracturing operations and the limited knowledge of the Karoo's aquatic biodiversity indicated in the 2016 CSIR Report triggers the application of the precautionary principle.[116] NEMA requires the application of a risk-averse, cautious approach, which considers the limits of current knowledge about the consequences of decisions and actions.[117]

112. The precautionary principle applies where, due to unavailable scientific knowledge, there is uncertainty as to the future impact of proposed operations.[118] It has been held to require authorities to insist on adequate precautionary measures to safeguard against harmful impacts, including the

[110] CBD Article 6(b).
[111] CBD Article 8(e).
[112] CSIR Shale Gas Development in the Central Karoo: A Scientific Assessment of the Opportunities and Risks (2016) ("**2016 CSIR Report**")
[113] 2016 CSIR Report at page 7-30.
[114] 2016 CSIR Report at page 7-55 to 6.
[115] 2016 CSIR Report at page 7-60.
[116] See *WWF South Africa v Minister of Agriculture, Forestry and Fisheries and Others* [2018] ZAWCHC 127 at para 104.
[117] Section 2(4)(a)(vii) of NEMA and its interpretation in *Fuel Retailers* at para 81.
[118] See *Fuel Retailers* at para 98.

contamination of water.[119] The 2016 CSIR Report indicates a lack of knowledge on the Karoo's aquatic ecosystems and biodiversity, and thus on the serious harm that fracking operations can inflict.

113. As discussed below, reduced groundwater availability threatens springs, wetlands and ephemeral rivers that support aquatic ecosystems. There are also documented fish kills and ecosystem damage in other shale regions due to wastewater contamination.[120]

114. Accordingly, we highlight the following ways in which the Regulations do not adequately provide for the protection of aquatic biodiversity, including in the Karoo –

    114.1. Aquatic biodiversity is inadequately protected by prohibited areas;

    114.2. Aquatic biodiversity is inadequately protected by the regulations dealing with waste produced as a result of fracturing;

    114.3. Aquatic and terrestrial biodiversity impacted by water vulnerability; and

    114.4. Aquatic Biodiversity is inadequately provided for by the prohibited activities, in particular, the water abstraction prohibitions.

Aquatic biodiversity is inadequately protected by prohibited areas

115. Regulation 5 of the Exploration and Production Regulations prohibits exploration and production of petroleum resources, including directional drilling, within certain areas. Of relevance to aquatic biodiversity are the following prohibited areas –

    115.1. Strategic Water Source Areas ("**SWSAs"**) as identified on the national web based environmental screening tool and within five kilometres of the edge of such SWSAs[121] ("**SWSA Prohibited Areas**");

    115.2. five kilometres from the edge of a thermal or cold spring[122] ("**Springs Prohibited Areas**"); and

    115.3. special nature reserves, national parks, nature reserves, world heritage sites, marine protected areas, specially protected forest areas, forest nature reserves and forest wilderness areas in terms of NEMPAA.[123] ("**NEMPAA Prohibited Areas**")

116. While the BLC welcomes the prohibition of exploration and production using fracturing technology in the above areas, including because several of the SWSAs overlap areas identified as having potential for shale gas extraction,[124] these prohibited areas do not adequately protect aquatic biodiversity, particularly in the Karoo. They are inadequate in three ways.

117. First, the NEMPAA Prohibited Areas do not include any buffers surrounding the NEMPAA protected areas, thus denying the factual connectivity between the NEMPAA Protected Areas and between these areas and areas not (yet) declared as NEMPAA protected areas. This results in, *inter alia*, habitat/ ecosystem fragmentation. Fragmented ecosystems are less able to withstand stress,[125] and the ability

[119] See *Fuel Retailers* at para 98.
[120] Peter Carrick, Biodiversity opinion (2026), page 7, attached to this submission.
[121] Regulation 5(g).
[122] Regulation 5(i).
[123] Regulation 5(b) read with National Environmental Management: Protected Areas Act 57 of 2003 (NEMPAA) section 48(1)(a) and (c).
[124] Water Research Commission 'SWSAs: Vital for South Africa's Water, Food and Energy Security' at page 14 https://www.wrc.org.za/wp-content/uploads/mdocs/Source%20water_web.pdf.
[125] 2016 National Protected Area Expansion Strategy ("**2016 NPAES**") at page 6.

of species and systems to adapt to climate change depends on habitats that are sufficiently connected to allow species to move.[126] The 2025 NBA also found that habitat fragmentation is a factor responsible for low genetic diversity in species, which underpins species' adaptability to environmental changes.[127]

118. By not providing for connectivity buffers between the NEMPAA Prohibited Areas, the Regulations undermine the purpose of NEMPAA, namely to effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity, and to provide for a diverse and representative network of protected areas.[128] This is also contrary to the CBD and its GBF, which require well connected protected areas.

119. Second, the prohibition only blocks fracturing in a closed list of NEMPAA Protected Areas. Notably, areas declared as protected environments under NEMPAA are not NEMPAA Prohibited Areas under the Regulations, thereby allowing fracturing operations in NEMPAA protected environments, and undermining their status and protection under NEMPAA.

120. Third, like rivers, estuaries and wetlands (discussed above), the Succulent and Nama-Karoo have long been underrepresented ecosystems under NEMPAA and are therefore left unprotected by the NEMPAA Prohibited Areas.

121. In this regard, the 2016 National Protected Area Expansion Strategy ("**2016 NPAES**") sets out a 20-year strategy for South Africa's protected areas.[129] According to the 2016 NPAES South Africa's current protected area network falls far short of representing all ecosystems.[130] The 2016 NPAES specifies that–

> '*ecosystems of the Nama-Karoo, Grasslands and Succulent Karoo are not well represented in the current protected area network, while lowland Fynbos and central Savanna ecosystems are also very under-represented.*'[131]

122. Of these under-represented ecosystems, the 2016 NPAES finds that-

> '*the Nama-Karoo is South Africa's least protected biozone… [h]owever, shale gas exploration and production could now potentially foreclose protected area expansion opportunities across much of the Nama-Karoo,*'[132]
>
> '*it is clear that protected area expansion in the Nama-Karoo has suddenly become urgent and that opportunities for significant protection at low cost may have already been lost.*' [133]

123. The 2016 NPAES therefore shows that the Nama-Karoo and Succulent Karoo specifically, where investigations into shale gas reserves are occurring,[134] are underrepresented in NEMPAA Protected Areas and are in dire need of protection. While the 2016 NPAES is a 10-year-old document (there has to date been no updated NPAES) the 2025 NBA indicates that these biozones were no better protected in December 2025.[135] In addition, San Parks has integration of conservation of the Nama and

[126] 2016 NPAES at page 6.
[127] 2025 NBA at page 45.
[128] NEMPAA section 2(c) and (d).
[129] 2016 NPAES at page vii.
[130] 2016 NPAES at page x.
[131] 2016 NPAES at page x.
[132] 2016 NPAES at page 29.
[133] 2016 NPAES at page 29.
[134] See for example Government Notice 5167 in Government Gazette 51138 (30 August 2024) "Invitation for comments on a proposed investigation in terms of section 50 of the Mineral and Petroleum Resources Development Act for the acquiring and processing of 2D land seismic data and airborne magnetic and magneto-telluric over the south-central basin of the Karoo.
[135] 2025 NBA at page 18.

Succulent Karoo into the Vision 2040 strategy through the Mega Living Landscapes planning. This Vision shows substantial portions of these areas as potential Mega Living Landscapes.[136]

124. It is thus clear that the environments where fracturing is most likely to occur are not covered by NEMPAA's protected areas, and that the Regulations fail to adequately protect biodiversity in the Nama-Karoo and Succulent Karoo, of which biodiversity the 2016 CSIR Report recognises there is limited knowledge.[137] This failure is contrary to South African law and policy, as well as our international obligations under the CBD and GBF, specifically the CBD requirements that South Africa integrates biodiversity conservation into regulations, and to promote sustainable development in areas adjacent to protected areas in a way that supports the protected areas, and the GBF goals A and B, and targets 3, 8 and 14 (see above).

125. In order to be legally compliant, the Regulations' prohibited areas must include protected environments declared under NEMPAA, critical biodiversity areas, areas prioritised in the NPAES, and for aquatic biodiversity specifically, FEPAs. As these Regulations do not do so, they are not fit for purpose.

Inadequate protection in terms of waste

126. The Exploration and Production Regulations define "waste" as '*includ[ing] flow back, fracturing fluids, and process water as well as well drilling waste*'. The Baseline Monitoring Regulations identify the management of waste and wastewater as one of the main issues confronting the use of fracturing technology.[138]

127. Rather than setting out how waste must be discharged or disposed of, the Regulations prohibit a closed list of methods to discharge or dispose of fracturing fluids, process water and any process water component, including that this waste cannot be discharged or disposed of –

    127.1. into a water resource without treatment to limits which comply to the water quality discharge limits contemplated in Appendix 4;[139] or

    127.2. onto land through irrigation without treatment to limits which comply to the water quality irrigation limits contemplated in Appendix 4.[140]

128. The Regulations offer no further guidance on how waste must be disposed of. This appears to be left to the Integrated Water and Waste Management Plan ("**IWWMP**"), which the Regulations require to be submitted by applicants to the designated agency before commencing fracking exploration and production operations.[141] The Minimum Information Requirements Regulations require the IWWMP to be prepared by a ground water or surface water specialist with the objective of giving-

    '*a site specific, implementable, management plan addressing all the identified water use and waste water management related aspects (e.g. process water balances, storm water management, groundwater management, water re-use and reclamation, water conservation and demand*

[136] San Parks, Vision 2040 (2024), available at https://vision2040.sanparks.org/wp-content/uploads/2024/09/SANParks-Vision-2040-Scenario-Based-High-Level-Strategy.pdf. See page 63 in particular.
[137] 2016 CSIR Report at page 7-60.
[138] Baseline Monitoring Regulations at page 200 item 3.7.
[139] Regulation 4(c)(i).
[140] Regulation 4(c)(ii).
[141] Regulations 8(9)(c) and 8(14)(c).

management, waste minimization and recycling) to ensure water efficiency and water management'.[142]

129. However, in our view the minimum information that the IWWMP must identify and model for the fracturing and production phases of the operations,[143] does not adequately provide for the protection of aquatic biodiversity in the disposal of wastewater.

130. Regarding the effects of the storage of this waste on aquatic biodiversity, scientific literature –

    130.1. Firstly, suggests that even small amounts of hydraulic fracturing wastewater could render certain amphibian breeding habitats unsuitable;[144]

    130.2. Secondly, posits that hydraulic fracturing wastewater ponds contain highly toxic synthetic chemicals that could potentially be ecological traps for water birds, turtles, frogs, and aquatic insects;[145] and

    130.3. Thirdly, warns that mixtures of these highly toxic synthetic chemicals will have effects that cannot be predicted by knowledge of individual chemicals.[146]

131. These concerns trigger the State's duties under NEMBA to conserve and sustain biodiversity and its components, and to consider animals' wellbeing in doing so; mixtures of toxic chemicals in wastewater and knowledge gaps on their cumulative effects trigger the precautionary principle; and the scientific literature signals threats to GBF goal A and B and targets 4,7, 8 and 14. Yet the Regulations and the IWWMP they provide for do not address these concerns.

132. The Minimum Information Requirements Regulations require that the IWWMP includes a map indicating the volumes of water that can be stored in each waste storage container.[147] However, these Regulations make no requirements specifying what materials these wastewater containers must consist of, whether they must be sealed, or how long wastewater can be stored in them. In failing to provide for these details, the Regulations allow the possibility of wastewater storage containers being ecological traps for aquatic biodiversity.

133. While the Regulations impose restrictions on substances that may be added to fracturing fluids (in Appendix 2) and on parameters for substances before wastewater may be discharged into water resources or on land (in Appendix 4), they do not impose any parameters for substances in wastewater stored in containers (noting that waste is defined as including flow back and process water – in addition to fracturing fluid). The substances in wastewater while stored in containers is thereby left unregulated by the Regulations, which fail to deal with any highly toxic synthetic chemicals (and the mixtures) contained in this wastewater. This is contrary to the State's NEMBA duties, the precautionary principle and the CBD and GBF, and is therefore unlawful.

Aquatic and terrestrial biodiversity impacted by water vulnerability

134. Ephemeral pans and rock pools in the Karoo support specialised invertebrate communities, including crustaceans such as fairy shrimps (*Anostraca*), tadpole shrimps (*Notostraca*), clam shrimps

[142] Minimum Information Requirements Regulations at page 51 at item 2.21.1.
[143] Minimum Information Requirements Regulations at page 52 at item 2.21.1.
[144] See E, Kiviat (2013) 'Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales' *Annals of the New York Academy of Sciences* at page 3.
[145] See E, Kiviat (2013) 'Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales' *Annals of the New York Academy of Sciences* at page 3.
[146] See E, Kiviat (2013) 'Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales' Annals of the New York Academy of Sciences at page 3 - referencing Entrekin, S.,M. Evans-White, B. Johnson & E.Hagenbuch. 2011. "Rapid expansion of natural gas development poses a threat to surface waters". *Front. Ecol. Environ*. 9: 503–511.
[147] Minimum Information Requirements Regulations at page 52 at item 2.21.1.

(*Spinicaudata* and *Laevicaudata*), as well as cladocerans and ostracods. Several taxa are entirely dependent on ephemeral wetlands to complete their life cycles. Although the invertebrate fauna of Karoo wetlands and watercourses remains poorly studied, contamination of groundwater feeding these systems could lead to localised extinctions and loss of biodiversity with limited capacity for recovery and deplete resources available to higher trophic levels. Migrant birds, e.g. flamingos, concentrate in large numbers when these resources are available, and they could therefore also be adversely impacted due to a depletion of resources.[148]

135. Significant volumes of water are required not only for hydraulic fracturing itself but also for associated activities such as drilling, dust suppression, cleaning of well pads, machinery and infrastructure, as well as meeting the domestic needs of an influx of workers into the region. In an arid environment such as the Karoo, where surface water is scarce and highly variable, these demands are likely to be met primarily through abstraction of groundwater.[149]

136. Reduced groundwater availability may diminish or eliminate baseflow to springs, wetlands, and ephemeral rivers, leading to the degradation or complete loss of aquatic and riparian habitats. Water-dependent terrestrial ecosystems, including those supporting endemic plant species and grazing systems relied upon by wildlife and livestock, may also be adversely affected. Declining water tables can alter water chemistry, increase salinity, and concentrate pollutants, further stressing biotic communities. Given the slow recharge rates characteristic of Karoo aquifers, such impacts may persist for generations.[150]

137. There are also major concerns when it comes to the toxicity of wastewater to biodiversity:[151]

    137.1. The management and disposal of wastewater generated during shale gas operations represents another risk to terrestrial biodiversity. Flowback and drill-produced water typically contain a complex mixture of hydraulic fracturing additives, dissolved salts, heavy metals, naturally occurring radioactive materials, and hydrocarbons.

    137.2. Documented incidents, from other shale gas regions, include acute mortality of in-stream fish, as well as deaths of terrestrial mammals that consumed polluted water from affected streams. Wastewater ponds themselves pose direct hazards to wildlife. Animals may drown after becoming trapped or suffer poisoning following ingestion or dermal exposure.

    137.3. In the Karoo context, these risks are amplified by prevailing arid conditions that concentrate animal activity around limited water sources. Birds, mammals, and reptiles are likely to be drawn to any standing water, including artificial wastewater ponds.

    137.4. Chronic exposure to low levels of contaminants may also result in sub-lethal effects, such as effects on reproduction, with long-term consequences for population viability.

138. It is for the above reasons, based on the best available science and the precautionary principle that either fracturing not be used, or alternatively, that regulations effectively avoid such risks.

[148] Peter Carrick, Biodiversity opinion (2026), page 7, attached to this submission.
[149] Peter Carrick, Biodiversity opinion (2026), page 8, attached to this submission.
[150] Peter Carrick, Biodiversity opinion (2026), page 8, attached to this submission.
[151] Peter Carrick, Biodiversity opinion (2026), page 8, attached to this submission.

F. Terrestrial biodiversity

139. This section is based on the expert opinion of Peter Carrick, which is attached to this submission (attached as "**Annexure B**"). It details the risks associated with fracturing under the proposed Regulations in relation to biodiversity.

140. Fracturing can lead to various direct and indirect impacts that are harmful to biodiversity. In terms of direct impacts, the installation of fracturing infrastructure includes roads, and a corresponding increase in traffic, which in turn leads to roadkill of mammals, birds and reptiles. A large number of species of mammals, birds and reptiles are killed, both diurnally and nocturnally, on the roads in the Karoo.[152] The impacts on slow reproducing (e.g. tortoises, honey badgers), slow moving vertebrates (e.g. snakes, tortoises) and species attracted to roads due to the presence of roadkill themselves (e.g. bat-eared foxes, polecats) is potentially the greatest concern.[153]

141. However, there are additional direct mortality risks with the presence of open wastewater ponds, which may cause wildlife poisoning or drowning. Flares to burn off excess gas may be another hazard for birds that has not been quantified.[154]

Habitat loss and fragmentation

142. Well pads, roads, pipelines and infrastructure fragment continuous habitats, disrupt corridors and isolate populations. The primary driver of biodiversity loss from fracking is habitat fragmentation. The construction of well-pads, access roads, pipelines, lay-down areas and storage facilities carves up continuous landscapes into isolated patches. This fragmentation disrupts migration, pollination, dispersal and ecological processes across large landscapes.[155]

143. The low resource availability within this arid region means that viable populations of plants cover large areas, and that animals need a large home range. Very little is known of the impact of fragmentation on ecological processes in the Karoo and as a result, almost nothing can be predicted for the impacts on Karoo invertebrate diversity and functioning. However, the loss of connectivity, edge effects (discussed below) and disruption of ecological processes associated with a network of linear structures (such as roads, powerlines and pipelines) are likely to undermine the biodiversity integrity of the region.[156] The precautionary principle should also be applied for the reason that there is a lack of knowledge along with disastrous and potentially irreversible consequences.

Edge effects and ecosystem change[157]

144. For many species, each spatial impact also disrupts ecological processes and creates "edge effects" that penetrate significantly further than the development footprint.

145. There are various "edge effects" of fracturing on the environment that have biodiversity impacts. Cleared areas increase vulnerability to invasive alien plants; dust reduces plant photosynthesis and damages indigenous grazing species' teeth; noise pollution disrupts communication, predator

[152] Peter Carrick, Biodiversity opinion (2026), page 5, attached to this submission.
[153] Peter Carrick, Biodiversity opinion (2026), page 6, attached to this submission.
[154] Peter Carrick, Biodiversity opinion (2026), page 6, attached to this submission.
[155] Peter Carrick, Biodiversity opinion (2026), page 4, attached to this submission.
[156] Peter Carrick, Biodiversity opinion (2026), page 4, attached to this submission.
[157] Peter Carrick, Biodiversity opinion (2026), page 4-5, attached to this submission.

detection and mating behaviour; vibrations interfere with subterranean species that rely on soil-borne cues; and artificial light alters behaviour, predator–prey dynamics and insect distributions.

146. In particular, there will be a vibrational impact on specialized subterranean mammals, including the critically endangered golden moles (also among the most threatened mammals globally), which utilise vibrational and physically conducted cues for foraging. The high-amplitude vibrations associated with seismic exploration and drilling operations will disrupt these sensory mechanisms. It will also impact surface dwelling animals that are use soil vibrations to find prey.

147. There will also be increased runoff and erosion, associated with virtually every aspect of shale gas development: This changes the infiltration and runoff properties on-site, and particularly with the low natural vegetation cover, high clay and low organic matter content of these soils, this makes Karoo landscapes highly susceptible to erosion.

Landscape vulnerability

148. The Karoo is slow to recover from disturbance due to low productivity and slow ecological succession. Rehabilitation success is limited and recovery can take decades.

149. Even where a number of active rehabilitation measures have been implemented, this is often met with poor success and require at least soil amelioration and seeding interventions. Where ecologically sound restoration methods have been used, recovery is very slow in these arid systems, and little re-growth or natural succession will take place in degraded or surrounding (edge-affected) areas in drought years. Therefore, rehabilitation monitoring periods of at least a decade are required to evaluate site level rehabilitation.[158]

150. Individual well sites may have relatively low localised impacts, but cumulative impacts across many sites are likely to be severe.[159]

G. Climate change

151. The Regulations have failed to consider the implications of providing a framework to enable fracturing in the context of, *inter alia*, the climate emergency; South Africa's policy position on addressing the climate emergency; government's international obligations in terms of the United Nations Framework Convention on Climate Change[160] and the Kyoto Protocol[161]; and government's obligations per the Constitution of the Republic of South Africa ("**the Constitution**")[162] to uphold the Bill of Rights, and in doing so, to refrain from exposing the people of South Africa to the harms of the climate crisis.

152. Temperatures in the region are increasing at twice the rate of the global average.[163] It is the government's constitutional imperative to protect the people of South Africa against the impacts of climate change. This includes committing to the transition away from fossil fuels. As a default position (and to avoid additional cost and exposure to climate risk) government should not be investing in fossil

[158] Peter Carrick, Biodiversity opinion (2026), page 9, attached to this submission.
[159] Peter Carrick, Biodiversity opinion (2026), page 9, attached to this submission.
[160] United Nations Framework Convention on Climate Change, New York: United Nations, General Assembly, 1992.
[161] UNFCCC (1997) Kyoto Protocol to the United Nations Framework Convention on Climate Change adopted at COP3 in Kyoto, Japan, 11 December 1997.
[162] Act 108 of 1996.
[163] South Africa First Nationally Determined Contribution under the Paris Agreement, September 2021. See at https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/South%20Africa%20First/South%20Africa%20updated%20first%20NDC%20September%202021.pdf.

fuels,[164] such as oil and gas exploration and production. The International Energy Agency said in a recent report[165] that if the world is to avoid irreversible, catastrophic climate change, no new oil or gas fields should be developed as at 2021 (i.e. no new investments should be made in gas production fields).

153. In light of the scientific consensus on the impacts of the climate crisis and South Africa's own vulnerability, the enablement of gas exploration and production in South Africa poses a serious threat to the rights, including the health, livelihoods and futures of rural and poor communities, women, children and future generations.

154. The UN Committee on the Rights of the Child's General comment 26 expressly links biodiversity loss to children's rights in the context of climate change.[166]

155. Given the established connection between fracking, climate change and biodiversity loss, both fracking regulation and policy development and project-by-project application assessment should be informed by a comprehensive climate change impact assessment and children's rights impact assessment.[167] The Regulations should expressly require that an applicant undertake a climate change impact assessment, not only in relation to the impacts of extraction, but also on the climate impacts of use of gas extracted over time due to methane emissions, etc. According to the *Cancel Coal*[168] judgment, failure to do so would amount to a failure to take into account a critically relevant consideration.[169]

156. The government has confirmed South Africa's extreme vulnerability to the impacts of climate change.[170] These impacts will largely be felt through: significant warming; impacts on water resources, such as decreased water availability; and a higher frequency of natural disasters. The impacts of climate change are crippling livelihoods and jobs, and will have long-term impacts on food security, food prices, human settlements, and health.

157. South Africa is already falling behind on its global and constitutional obligations to address climate change. The Nationally Determined Contribution ("**NDC**") falls outside the fair share range; and is not consistent with the Paris Agreement 2°C target – let alone the 1.5°C benchmark set by the United Nations Intergovernmental Panel on Climate Change ("**IPCC**"). This, while it has been recognised that

[164] https://www.iea.org/reports/net-zero-by-2050.
[165] https://www.iea.org/reports/net-zero-by-2050.
[166] Para 1: The extent and magnitude of the triple planetary crisis, comprising the climate emergency, the collapse of biodiversity and pervasive pollution, is an urgent and systemic threat to children's rights globally.
Para 20: The right to life is threatened by environmental degradation, including climate change, pollution and biodiversity loss, which are closely linked to other fundamental challenges impeding the realization of this right, including poverty, inequality and conflict. States should take positive measures to ensure that children are protected from foreseeable premature or unnatural death and threats to their lives that may be caused by acts and omissions, as well as the activities of business actors, and enjoy their right to life with dignity.
Para 35: Environmental degradation, including the climate crisis, is a form of structural violence against children and can cause social collapse in communities and families. Poverty, economic and social inequalities, food insecurity and forced displacement aggravate the risk that children will experience violence, abuse and exploitation. For example, poorer households are less resilient to environment-related shocks, including those caused or exacerbated by climate change, such as rising sea levels, floods, cyclones, air pollution, extreme weather events, desertification, deforestation, droughts, fires, storms and biodiversity loss.
Para 39: Climate change, biodiversity loss and the degradation of ecosystems are obstacles to the realization of children's right to health.
Para 58: Indigenous children are disproportionately affected by biodiversity loss, pollution and climate change.
[167] See *South Durban Community Environmental Alliance and Another v Minister of Forestry, Fisheries and the Environment and Others* (479/2023) [2025] ZASCA 134 (17 September 2025).
[168] *African Climate Alliance and Others v Minister of Mineral Resources and Energy and Others* (56907/2021) [2024] ZAGPPHC 1271 (4 December 2024).
[169] See also, the UN Committee on the Rights of the Child's General Comment 26, which affirms that there is a duty on states to consider the best interests of the child in all significant decisions affecting the environment: '[*e*]*nvironmental decisions generally concern children, and the best interests of the child shall be a primary consideration in the adoption and implementation of environmental decisions, including laws, regulations, policies, standards, guidelines, plans, strategies, budgets, international agreements and the provision of development assistance*.' General Comment 26 emphasises that there is a specific obligation on states to conduct a child's rights impact assessment where policies and projects are anticipated to have significant environmental and climate change consequences. Echoing the earlier guidance in General Comment 14, the Committee has emphasised that these impact assessments should be undertaken "as early as possible in the decision-making process".
[170] The National Development Plan, the National Climate Change Response White Paper, the National Climate Change Adaptation, the Low Emission Development Strategy 2050.

South Africa is warming at a rate that is about twice the global average temperature increase rate. The effects of this will be catastrophic and have a disproportionate impact on the most vulnerable in South Africa.

158. Methane, which is the principal component of the gas intended to be produced from the fracturing process, does not persist in the atmosphere as long as carbon dioxide, but its climate impact is more than 80 times stronger in the short-term (20-year) time frame and 28 times stronger over the long term (100-year) time frame; it is the second-biggest driver of climate change.[171] Gas is, therefore, as emission-intensive as coal, if not more so, and as such, is major a contributor to climate change.

159. To ensure appropriate action, significant ambition is needed in the next ten years to sufficiently reduce Green-House Gases ("**GHG**") emissions within the necessary trajectory range and to get South Africa where it needs to be to avoid the worst impacts of the climate crisis. Doing this requires a commitment to phase out existing fossil fuels and halt new fossil fuel investment as soon as possible and certainly to refrain from locking-in to new fossil fuel infrastructure. The Regulations, in enabling fracking for gas production, stand in contradiction to the just transition and climate response imperative, and we submit that it is both unreasonable and irrational, in addition to posing a substantial threat to the Constitutional rights of the people of South Africa.

160. It must also be emphasised that the inevitable negative impacts on aquatic and terrestrial biodiversity as a result of fracturing, which have been comprehensively detailed above, will compromise climate change mitigation and adaptation. This is because functioning ecosystems are more resilient to climate change, enabling the continued provision of ecosystem goods and services on which all people depend, including critical climate regulating services. On the other hand, failure to reduce GHGs will have a catastrophic impact on biodiversity, undermining ecosystems' abilities to provide such services. A recent IPBES-IPCC Report on Biodiversity and Climate Change noted as follows in this regard:

> '*Increased atmospheric greenhouse gas concentrations lead to increased mean temperatures, altered precipitation regimes, increased frequency of extreme weather events, and oxygen depletion and acidification of aquatic environments, most of which adversely affect biodiversity. Reciprocally, changes in biodiversity affect the climate system, especially through their impacts on the nitrogen, carbon and water cycles. These interactions can generate complex feedbacks between climate, biodiversity and humans that may produce more pronounced and less predictable outcomes. Ignoring the inseparable nature of climate, biodiversity, and human quality of life will result in non-optimal solutions to either crisis.*'[172]

161. In addition, there is the issue of creating "stranded assets" or infrastructure. Failure to properly manage induced seismicity can lead to a build-up of public tensions against hydraulic fracturing, spurring a

[171] One ton of methane has the same climate-forcing impact as 84 tons of CO2 over a 20-year period and the same impact as 28 tons of CO2 over a 100-year period. See G. Myhre et al., "Anthropogenic and Natural Radiative Forcing," Table 8.7, in Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, T. F. Stocker et al., eds. (Cambridge, U.K., and New York, N.Y.: Cambridge University Press, 2013), https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf. See also, U.S. Environmental Protection Agency (hereinafter U.S. EPA), "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2017," April 2019, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2017.

[172] Pörtner, H.O., Scholes, R.J., Agard, J., Archer, E., Arneth, A., Bai, X., Barnes, D., Burrows, M., Chan, L., Cheung, W.L., Diamond, S., Donatti, C., Duarte, C., Eisenhauer, N., Foden, W., Gasalla, M. A., Handa, C., Hickler, T., Hoegh-Guldberg, O., Ichii, K., Jacob, U., Insarov, G., Kiessling, W., Leadley, P., Leemans, R., Levin, L., Lim, M., Maharaj, S., Managi, S., Marquet, P. A., McElwee, P., Midgley, G., Oberdorff, T., Obura, D., Osman, E., Pandit, R., Pascual, U., Pires, A. P. F., Popp, A., Reyes-García, V., Sankaran, M., Settele, J., Shin, Y. J., Sintayehu, D. W., Smith, P., Steiner, N., Strassburg, B., Sukumar, R., Trisos, C., Val, A.L., Wu, J., Aldrian, E., Parmesan, C., Pichs-Madruga, R., Roberts, D.C., Rogers, A.D., Díaz, S., Fischer, M., Hashimoto, S., Lavorel, S., Wu, N., Ngo, H.T. 2021. IPBES-IPCC co-sponsored workshop report on biodiversity and climate change; IPBES and IPCC. DOI:10.5281/zenodo.4782538.

loss of 'social license,' and creating the potential for extreme countermeasures. For example, gas production in the Groningen Field of the Netherlands has caused decades worth of induced earthquakes, the largest being the ML 3.6 Huizinge event on 16 August 2012.[173] Social unrest over these events eventually spurred the decision to abandon this field,[174] stranding ~800 billion m³ of gas.[175]

H. Cumulative impacts

162. Fracking does not operate within a vacuum. It is paramount that the Regulations consider cumulative impacts in their entirety, which involves a vigorous cumulative impact assessment of water quantity and quality, biodiversity, socioeconomic contexts, air quality, GHG, strategic environmental assessments, and long-term regional monitoring.

163. Consideration should be given to a project's contribution to impacts across the region, looking at the cumulative impacts of not only industry projects on water quantity and quality, biodiversity, socioeconomic contexts, air quality, and GHG, but also considering the rest of the contributors from the region to these key indicators of ecosystem and human health.

164. The Regulations fail to mandate Cumulative Impact Assessments. In particular, Regulation 7(a)–(d) read with Regulation 8 of the Exploration and Production Regulations, as well as the Minimum Information Regulations, which are deficient in this regard. The Regulations require assessment of impacts at a project or site-specific level, but do not mandate assessment of cumulative impacts arising from multiple wells, sequential authorisations, or region-wide development. This omission is unlawful.

165. Section 24G(1)(aa)(H)(BB) of NEMA expressly requires consideration of cumulative effects. The Constitutional Court has confirmed that cumulative impacts are not optional or secondary considerations, but central to lawful environmental decision-making.[176] By permitting authorisations without a regional or strategic cumulative impact framework, the Regulations invite piecemeal decision-making and consequent unlawful environmental degradation.

166. Fracking impacts are cumulative due to:

    166.1. High well density over time;

    166.2. Repeated hydraulic fracturing events;

    166.3. Progressive landscape transformation; and

    166.4. Incremental groundwater abstraction and pressure alteration.

167. Some of these impacts are discussed above. In addition to those, the Regulations should address the cumulative impacts on water ecosystem degradation, baseline fragmentation, cumulative biodiversity and habitat fragmentation, and cumulative induced seismicity and infrastructure risks. Single-project or single-well assessments systematically underestimate risk and ecological harm.

[173] Muntendam-Bos et al., 2022.
[174] van der Voort, 2015.
[175] Muntendam-Bos et al., 2022.
[176] *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management and Others* 2007 (6) SA 4 (CC).

Baseline fragmentation undermines cumulative assessments[177]

168. The Regulations allow baseline data to be collected on a project-by-project basis, resulting in fragmented datasets incapable of supporting cumulative assessment. This undermines the lawful application of section 24O of NEMA. Cumulative impacts are detected and attributed through regional baseline datasets, long-term monitoring, and integrated ecological and hydrological indicators. Short, isolated baselines mask gradual degradation.

Incremental water ecosystem degradation

169. The Regulations focus on individual abstraction volumes and contamination thresholds, but do not require assessment of aggregate impacts on groundwater systems, baseflows, wetlands, and springs across a catchment or aquifer. Indeed, the definition of "cumulative impact", found in the Minimum Information Regulations, is overly narrow and restricted to "the activity" in question:

> '"*cumulative impact" means the past, current and reasonably foreseeable future* ***impact of an activity, considered together with the impact of activities associated with that activity****, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities;*' (our emphasis)

170. This approach is inconsistent with the Ecological Reserve requirements under sections 16–18 of the National Water Act and the public trusteeship duty under section 3. Incremental degradation that cumulatively compromises ecosystem functioning is unlawful, even where individual activities appear compliant.

171. In addition, cumulative seismic impacts pose secondary risks to groundwater integrity and surface ecosystems, which are not incorporated into the Regulations. In relation to water ecosystem integrity, scientific evidence demonstrates that:

    171.1. Small, repeated groundwater abstractions can cumulatively lower regional water tables;

    171.2. Pressure changes from multiple wells can alter flow paths and discharge zones; and

    171.3. Ecosystem collapse may occur without detectable contamination.

172. Cumulative hydrological impacts are therefore foreseeable and must be assessed *ex ante*.

Cumulative biodiversity and habitat fragmentation impacts[178]

173. The Regulations rely on fixed buffers and site-based mitigation measures, without requiring assessment of landscape-scale habitat fragmentation. This is irrational and inconsistent with section 2(4)(r) of NEMA, which requires protection of ecosystems and biodiversity as a whole.

174. Authorising multiple developments that are individually compliant but collectively destructive constitutes unlawful decision-making. This includes cumulative infrastructure impacts such as roads, well pads, pipelines, fencing, noise and light pollution, which result in (*inter alia*):

    174.1. Loss of habitat connectivity;

[177] See regulations 8(5) and (6).
[178] See, in particular, regulations 5, 6, 7(c), 8(9), 8(14), and 9(2).

174.2. Disruption of species movement;

174.3. Increased edge effects and invasive species; and

174.4. Long-term ecosystem simplification.

175. These impacts cannot be mitigated on a site-by-site basis and need to be accounted for in an assessment process. This is in addition to the cumulative effect of multiple wells and multiple fracturing sites.

176. The importance of this cannot be overstated. In 2016 the leading scientific institutions of South Africa, with participation from a vast number of the leading scientists, completed a comprehensive scientific assessment of the opportunities and risks of shale gas development in the central Karoo. This constituted a Strategic Environmental Assessment ("**SEA**") of the risks of hydraulic fracturing in the central Karoo. For the biodiversity and ecological impacts chapter, the unequivocal outcome is that environmental impacts need to be assessed cumulatively, not individually. The importance of cumulative environmental assessments is also highlighted in the chapter on water resources, both on the surface and underground sources.[179] Across all four of the Regulations there is little or no reference to cumulative effects or an SEA, with an exception in which an SEA is mentioned in relation to monitoring seismic activity.[180]

177. The biodiversity and ecological impacts chapter of the 2016 SEA develop detailed models of the biodiversity impacts for both a large and a small gas development scenario. On the small gas development scenario, leaving aside the impacts of reconnaissance and exploration, the minimal infrastructure required directly for just a small shale gas development scenario is (this represents the least possible economically viable development): [181]

177.1. 550 wells on about 55 well-pads in one 30 x 30 km production block;

177.2. downstream development results in a 1 000 MW combined cycle gas turbine power station located less than 100 km from the production block.

178. The total estimated footprint of development within a 30x30 km block would be: [182]

178.1. approximately 110 ha of well-pads;

178.2. up to 61 km of new access road equivalent to approximately 61 ha of transformation assuming that roads are 10 m wide;

179. This represents less than 1% of the 30x30 km development block, however, the cumulative impact is that 25% of the area is within 500 m of a well-pad or access road and 48% is within 1 km.

180. A case study for this is present in a spatial SEA for the 171 811 km2 region of the central Karoo for which an exploration right had been lodged by Shell, which demonstrates a clearer picture of the actual magnitude of these developments. Four levels of Ecological and Biodiversity Importance and Sensitivity ("**EBIS**") are mapped across this area and incorporating, among others, the impact on:[183]

180.1. Provincial spatial biodiversity plans, Critical Biodiversity Areas ("**CBA**") and Ecological Support Areas ("**ESA**");

[179] Peter Carrick, Biodiversity opinion (2026), page 10, attached to this submission.
[180] See the "Baseline Monitoring Regulations", regulation 3.4.
[181] Peter Carrick, Biodiversity opinion (2026), page 10, attached to this submission.
[182] Peter Carrick, Biodiversity opinion (2026), page 10, attached to this submission.
[183] Peter Carrick, Biodiversity opinion (2026), page 10, attached to this submission.

180.2. terrestrial ecosystems;

180.3. plant species diversity and endemism;

180.4. terrestrial fauna (including mammals, birds, reptiles and invertebrates);

180.5. aquatic ecosystems and species;

180.6. extent of impact on South African biomes, vegetation types and edaphic habitats; and

180.7. mitigation measures.

181. These impacts need to be accounted for and addressed in the Regulations but are not.

Induced seismicity and infrastructure risk accumulation[184]

182. The Regulations do not require cumulative assessment of induced seismic risk associated with multiple fracturing operations and wastewater disposal. This omission fails to consider a relevant risk factor, rendering authorisations reviewable under the Promotion of Administrative Justice Act ("**PAJA**")[185].

183. International evidence and Dr Ryan Schultz (his expert opinion is attached as "**Annexure C"**) confirm that induced seismicity risk increases with the number of injection events, the volume and pressure of injected fluids, and temporal clustering of operations.

184. In his expert opinion (attached as **Annexure C**), Dr Ryan Schultz details how multiple fracturing wells are very likely to cause induced seismicity (earthquakes), which could result in damage to property, the environment and even cause injuries and fatalities. He confirms that the negative, and particularly cumulative impacts of fracturing or fracking, is a scientific probability.

185. Accordingly, he finds that the Regulations should be designed with the expectation that induced seismicity will occur. Contrary to this, the Regulations underestimate the risks of induced seismicity, possibly because they are based on outdated science (from around 2015).

186. Legally, lawmakers must use the most up-to-date scientific knowledge to base laws on. This is not discretionary, and if there is scientific concern about the safety of a technology and particularly of the cumulative effects of fracking, this should be reflected in the lawmaking. It is clear from Dr Schultz' opinion that fracking carries with it considerable and serious risk to biooth the environment and human life. We therefore submit that fracking, as an activity, should not be permitted. If lawmakers disregard these warnings, then the recommendations of Dr Schultz should be implemented and included in the Regulations.

187. The structure of the Regulations permits incremental approvals without a binding regional cap, threshold, or strategic environmental assessment. This constitutes classic "salami-slicing", rejected by South African courts as unlawful.[186]

[184] See regulations 7(a), 8(2), and 17(2)(k) and (l).
[185] Act 3 of 2000.
[186] *South Durban Community Environmental Alliance and Another v Minister of Forestry, Fisheries and the Environment and Others* (479/2023) [2025] ZASCA 134 (17 September 2025).

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SPECIFIC COMMENTS

188. The specific comments in this section are limited to the Exploration and Production Regulations.

Section/ Regulation	Current formulation	Comment/ suggested change
Regulation 1: Definitions	"**Competent person**" meaning assigned to it in the Mineral and Petroleum Resources Development Regulations, 2004.	The only place that this is referred to is in Regulation 19(4) in the context of an independent well examination. It is inappropriate for someone from the Department of Minerals and Resources to conduct a well examination as this should be carried out by an independent well expert. We recommend that reference to "competent person" should be struck from the draft Regulations.
	"**consolidated assessment report**" means the report containing the environmental information as contemplated in the Minimum Information Requirements for Baseline Monitoring for Onshore Exploration Operations and the Minimum Information Requirements for the Exploration and Production of Onshore Petroleum Using Fracturing Technology;	In the Minimum Information Requirements for the Exploration and Production of Onshore Petroleum Using Fracturing Technology this is defined as *"'consolidated assessment report" means the report contemplated in regulation 8(9) of the NEMA Fracturing Regulations*;', and in the Minimum Information Requirements for Baseline Monitoring for Onshore Exploration Operations this is defined as "*consolidated assessment report" means the report contemplated in regulation 8(2)(a) of the draft NEMA Fracturing Regulations*;'. Currently, there are no Fracturing Regulations and so this cross-reference to regulation 8(9) is unclear. Assuming the language was intended to indicate the originator of the definition (the main draft Regulations/ the "Exploration and Production Regulations", Regulation 8(9) reads: '*After the acceptance of the scoping report, the applicant must, at intervals contemplated in the Environmental Impact Assessment Regulations, submit to the competent authority for approval, a consolidated assessment report which–* *(a) has considered the results of the baseline monitoring report contemplated in subregulation (6);* *(b) complies with the Minimum Information Requirements for the Exploration and Production of Onshore Petroleum Using Fracturing Technology; and* *(c) includes the following appendices:* *i. the environmental management programme which must include a "chance find protocol";* *ii. an integrated operational monitoring plan for all identified environmental themes;* *iii. an integrated water and wastewater management plan;* *iv. an emergency and spill contingency plan;* *v. a solid waste management plan;*

Section/ Regulation	Current formulation	Comment/ suggested change
		vi. a preliminary well layout including a buffer to allow for movement of the well pad without the need for an amendment to the environmental authorisation; *vii. a well design based on the geological information obtained through the drilling of the stratigraphic wells;* *viii. the drillilng fluid to be used;* *ix. a list of fracturing fluids to be used;* *x. the relevant plans and reports contemplated in the Financial Provisioning Regulations; and* *xi. proof of the arrangements made to secure the financial provision*.' Regulation 8(2)(a) reads: *'At the intervals contemplated in the Environmental Impact Assessment Regulations an applicant must submit to the competent authority for approval –* *(a) a consolidated assessment report and environmental management programme which comply with the Minimum Information Requirements for Baseline Monitoring for Onshore Exploration Operations*;' It is clear that this is not a definition but rather a cross-reference gone wrong and leaves the reader chasing sections across three sets of regulations. Saying that it is unclear is an understatement. We therefore recommend that the current definition be replaced with this one: '"consolidated assessment report" means a comprehensive, integrated and evidence-based report that— (a) synthesises all environmental, hydrological, ecological, biodiversity, social and climate-related assessments undertaken for a proposed activity, including all specialist studies, baseline data, monitoring results, modelling outputs and risk analyses; (b) evaluates cumulative, indirect, residual and long-term impacts at an appropriate ecosystem, catchment or landscape scale, and not solely at project or site level; (c) explicitly assesses impacts on ecosystem integrity, ecological functioning, biodiversity, groundwater-dependent ecosystems, and the Ecological Reserve, and not only compliance with numerical standards or mitigation measures; (d) identifies scientific uncertainty, knowledge gaps, thresholds, tipping points and the risk of irreversible harm, and applies the precautionary principle in evaluating whether impacts can be avoided rather than merely mitigated; (e) tests the effectiveness and feasibility of proposed avoidance, mitigation, rehabilitation measures, and clearly distinguishes between avoidable, unavoidable and irreversible impacts;

Section/ Regulation	Current formulation	Comment/ suggested change
		(f) demonstrates consistency with the Constitution, the National Environmental Management Act, the National Water Act, the National Environmental Management: Biodiversity Act, and any applicable biodiversity, water or conservation plans and policies; (g) is based on independent specialist input, transparent methodologies and publicly available data, and is sufficient to enable the competent authority to make an informed, lawful and rational decision in accordance with section 24O of the National Environmental Management Act.'
	"**holder**" means a person who holds an exploration or production right issued in terms of the Mineral and Petroleum Resources Development Act, 2002 for which the exploration or production operation requires the use of fracturing and a person who holds an environmental authorisation in terms of the Act, for an exploration or production activity which requires or uses fracturing technology;	Considering that the most common technology used in fracturing involves water, this should form part of the definition (like an environmental authorisation). Therefore we suggest the following inclusion: **'"holder"** means a person who holds an exploration or production right issued in terms of the Mineral and Petroleum Resources Development Act, 2002 for which the exploration or production operation requires the use of fracturing and a person who holds an environmental authorisation in terms of the Act, as well as a water use licence in terms of the National Water Act 36 of 1998, for an exploration or production activity which requires or uses fracturing technology;'
	"well integrity" means the application of technical, operational and organisational solutions to reduce the risk of uncontrolled release of formation fluids throughout the life of a well.	This definition changes the common meaning of "structural integrity", which means '*Structural integrity is the ability of a component, structure or asset to operate at optimum level under the pressure of a load, including the weight of the asset itself*.'[187] It changes it to a definition that centres "integrity" on the reduction of risk. This is contrary to NEMA (particularly the precautionary principle) and the duty of the state to protect the environment and people from harm (not merely to reduce the risk of harm). It essentially makes failure acceptable if risk was reduced. It is also unclear what "uncontrolled release" means, and if it would include, for example, gradual release of harmful gases and/or fluids. Further, it limits integrity to fluids and ignores harmful gases that could be released. It also does not provide guidance on how to know when well integrity has been breached (thresholds, monitoring, etc.). This is therefore an unconstitutional definition.

[187] https://libguides.brunel.ac.uk/structuralintegrity#:~:text=What%20is%20structural%20integrity?,use%20and%20meet%20regulatory%20requirements.

Section/ Regulation	Current formulation	Comment/ suggested change
		We therefore propose the following definition: '"well integrity" means the design, construction, operation, monitoring, maintenance, closure and post-closure management of a well in a manner that prevents pollution, ecological degradation and unacceptable risk to the environment, including groundwater, surface water, aquatic ecosystems and groundwater-dependent ecosystems, by ensuring that no leakage, migration, pressure-induced movement or uncontrolled release of fluids or gases occurs at any time throughout the full life cycle of the well, including after abandonment, and that such prevention is demonstrated through verifiable performance standards, independent monitoring and ongoing compliance with the National Environmental Management Act, 1998, and the National Water Act, 1998.'
		The following definitions are missing from the draft Regulations: • "**Life of the well**", suggested definition: 'the full life cycle of the well, including construction, operation, decommissioning, rehabilitation, and abandonment;' • "**irrigation**", suggested definition: '"irrigation" means the intentional application of water, wastewater, treated effluent or any liquid containing dissolved or suspended substances to land or vegetation for agricultural, horticultural, silvicultural, rehabilitation or land-management purposes, by any method, including surface, subsurface, drip, spray or infiltration, where such application may result in infiltration to soil, movement to groundwater, runoff to surface water, uptake by biota, or accumulation in soils or sediments.'; • "**water resource**", suggested definition: 'as defined in the National Water Act 36 of 1998'. • "**final use**" (from Regulation 21(1)), suggested definition: 'means when production or exploration of the well in question has ceased'. • "**drilling fluid**" (definition needed).
Regulation 2: Purpose of these Regulations		The purposes listed do not explicitly mention the protection of the environment from harm and the need to give effect to the precautionary principle. Regulations, as subordinate legislation, are required under NEMA in order to regulate an activity that could cause harm to the environment, such that it does not. Therefore, this purpose needs to be explicitly stated. In addition, the stated purposes do not explicitly include ensuring transparency, public access to information, or accountability in the regulation of hydraulic fracturing activities.

Section/ Regulation	Current formulation	Comment/ suggested change
		Suggested inclusion into Regulation 2: 'The purpose of these Regulations is to— (a) regulate the exploration for and production of onshore petroleum resources requiring fracturing technology in a manner that prevents pollution, ecological degradation and harm to the environment, including harm to water resources, biodiversity and ecosystem integrity; (b) give effect to the environmental management principles set out in section 2 of the National Environmental Management Act, 1998, including the precautionary principle, by requiring a risk-averse and cautious approach where there is scientific uncertainty regarding environmental impacts; (c) ensure that such activities are authorised and undertaken only where it has been demonstrated, on the basis of independent and reliable information, that significant environmental harm can be avoided, and not merely mitigated; (d) ensure that the protection of the environment and the interests of present and future generations are not subordinated to resource exploitation; (e) to promote transparency, accountability and public access to information relating to hydraulic fracturing activities and their impacts on the environment and water resources; ~~(a)~~(f) set general and specific requirements, practices and standards for the identification, assessment, avoidance and management of environmental impacts associated with all phases of exploration and production of onshore petroleum resources requiring the use of fracturing technology; ~~(b)~~(g) prohibit certain activities related to the exercising of an exploration or production right for onshore petroleum requiring the use of fracturing technology; ~~(c)~~(h) identify geographical areas in which exploration or production operations for onshore petroleum requiring the use of fracturing technology are prohibited or restricted; ~~(d)~~(i) provide for the preparation and implementation of a baseline monitoring plan prior to the commencement of exploration operations which will require the use of fracturing technology; ~~(e)~~(j) set general and specific requirements for ongoing environmental monitoring of exploration and production operations using fracturing technology; ~~(f)~~(k) give effect to the coordination between decision-making authorities on the requirements for baseline monitoring, public participation, impact assessment requirements and integrated operational monitoring; and ~~(g)~~(l) facilitate the submission of a consolidated assessment report to support the application for a water use licence and an environmental authorisation, through the implementation of minimum information requirements.
Regulation 3: Application of these Regulations	These Regulations apply throughout the Republic of	As discussed above, the draft Regulations, as currently formulated, are geared towards hydraulic fracturing technology. Indeed, the 2022 iteration explicitly referred to "hydraulic fracturing". It is unclear

Section/ Regulation	Current formulation	Comment/ suggested change
	South Africa to all exploration and production operations of onshore petroleum resources intending to and using fracturing technology.	why the scope of the Regulations has been broadened despite only catering for hydraulic fracturing. However, this leaves a likely gap in that technology that could fall under these regulations are not in fact dealt with by the Regulations. Should a broader interpretation nonetheless be preferred, the Regulations should reflect the specifics of the technology (such as the substance it will you, waste products, etc.). We therefore suggest the following addition: 'These Regulations apply throughout the Republic of South Africa to all exploration and production operations of onshore petroleum resources intending to and using hydraulic fracturing technology.'
Regulation 4 – Prohibited Activities	The following activities are prohibited in the exercising of an exploration or production right for onshore petroleum resources using fracturing technology: (a) in areas where the rainfall is under 400mm per annum, the abstraction of water except from deep saline aquifers, for any purpose in the exploration or production operation other than for drinking, domestic use or the preparation of slurry for cement mixtures on which tests will be conducted;	For the reasons discussed above, this is irrational. Water systems are interconnected and deep saline aquifers form part of a water ecosystem. In addition, the measure should not be whether there is less than 400mm per annum as this is an arbitrary amount and in any event, rainfall's impact on water systems is measured over years, not just one season. For these reasons, we suggest that this provision be struck. In its place we suggest the following wording from the 2022 iteration of the Regulations: 'The use of potable water for any purpose in the hydraulic fracturing operation other than for drinking or domestic use;'
	(b) the disposal of process water from the exploration or production operation without at least one reuse;	For the reasons set out above, we submit that this should be struck in its entirety.

Section/ Regulation	Current formulation	Comment/ suggested change
	the discharge or disposal of fracturing fluids, process water or any other component of process water– (i) into a water resource without treatment to limits which comply to the water quality discharge limits contemplated in Appendix 4;	These discharge limits might still be harmful to biodiversity and water ecosystems, which is different from discharge into water for human consumption. These limits need to be re-evaluated with biodiversity and ecosystem integrity in mind. In addition, the list is a closed list and does not cater for other possible chemicals that are harmful to human and ecological health. We submit that this should be struck in its entirety or modified after consultation with specialists.
	(ii) onto land through irrigation without treatment to limits which comply to the water quality irrigation limits contemplated in Appendix 4;	We believe this should be struck on the basis of the comment above.
	(d) the disposal to landfill, of sludge with a moisture content of >40% or that liberates moisture under pressure in landfill conditions and which has not been stabilised by treatment;	There are a number of issues with this provision: 1. '*has not been stabilised by treatment*' creates a loophole, as it by inference creates the meaning: if the sludge has been "stabilised by treatment", then disposal to landfill is acceptable. 2. Many commonly accepted "stabilisation" methods (lime addition, dewatering, solidification) do not eliminate toxicity or leachability (especially for salts and TDS, hydrocarbons, heavy metals, persistent organic compounds). This enables reclassification of hazardous sludge as landfill-acceptable, contrary to pollution-prevention principles. 3. Moisture thresholds do not protect groundwater. Leachate generation occurs well below 40% moisture, Karoo landfills are often located in hydrologically vulnerable environments, and leachate migration is governed by chemistry and persistence, not moisture alone. This is inconsistent with the NWA duty to prevent pollution of water resources, including groundwater. This also ignores long-term contaminant mobilisation, and cumulative loading to landfill liners. This means sludge could meet the clause yet still generate toxic leachate for decades, exceed landfill liner design life, and contaminate groundwater post-closure. From an environmental law perspective, this is predictable and preventable harm.

Section/ Regulation	Current formulation	Comment/ suggested change
		4. Hydraulic fracturing sludge often contains radioactive material, unknown chemical mixtures, degradation products, and endocrine disruptors, all of which are environmentally harmful. Landfill disposal encourages the worst disposal pathway. Landfill disposal is one of the highest-risk, least reversible options and it externalises long-term environmental costs to the public. This provision incentivises landfill disposal rather than avoidance, recovery, or secure containment. We therefore suggest the following: '(d) the disposal to landfill, of sludge and other waste.;'
	(e) the storage of process water for reuse or disposal in pits, retention dams or pollution control dams;	To avoid the risks of the open storage of process water,[188] the Regulations must clearly and explicitly provide for prohibition of open storage of process water, rather than merely prohibiting a closed list of three undefined types of process water storage. Additionally, the terms "pits", "retention dams" and "pollution control dams" used in this subregulation should be defined in the Regulations. Suggested wording: "(e) the storage of process water for reuse or disposal in pits, retention dams, or pollution control dams, which is not sealed;"
	(f) the storage of drill cuttings, sludge and waste other than in above ground tanks or leakproof skips;	More is needed here. Storage needs to be safe and secure. Suggested wording: '(f) the storage of drill cuttings, sludge or any waste arising from fracturing operations except where such storage occurs exclusively in purpose-built, sealed, above-ground containment systems that— (i) are designed, constructed and maintained to prevent any leakage, seepage, overflow or release of liquids or contaminants to soil, groundwater or surface water; (ii) are provided with impermeable secondary containment capable of containing at least 110 per cent of the maximum storage volume; (iii) are protected from rainfall, flooding and overtopping; (iv) are subject to continuous monitoring, routine inspection and documented maintenance; and

[188] At page 8 of the Peter Carrick report.

Section/ Regulation	Current formulation	Comment/ suggested change
		(v) are used only for temporary storage, pending removal to an authorised treatment or disposal facility.'
	(g) the use of groundwater monitoring boreholes for abstraction purposes; and	Groundwater should not be used in fracturing activities. Suggested wording: '(g) the use of groundwater ~~monitoring~~ boreholes for abstraction purposes; and'
	(h) the use of substances identified in Appendix 2 as additives to fracturing fluids	As discussed above, having a closed list can result in substances not listed, but that are also harmful being used. In addition, the combination or product of individual substances can also be harmful. Suggested wording: '(h) the use, introduction, injection or presence, whether direct or indirect, of any substance, mixture or product listed in Appendix 2, or any substance that is functionally equivalent, chemically similar, or that degrades, transforms or reacts to form a substance listed in Appendix 2, as an additive to fracturing fluids.'
Regulation 5: Prohibited areas	The exploration and production of petroleum resources, including directional drilling are prohibited within– (a) heritage sites and sites containing heritage resources, objects or structures defined in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) or the Kwa-Zulu Natal Amafa and Research Institute Act, 2018 (Act No. 5 of 2018); (b) areas identified in terms of section 48(1)(a) and (c) of the National Environmental	As discussed above, there are other areas that should be listed, but are not. We suggest that the following areas be added to Regulations 5: '(j) areas declared or proposed for declaration as protected areas in terms of the National Environmental Management: Protected Areas Act, 2003, including nature reserves, national parks, protected environments and marine protected area buffer zones; (k) areas identified as Critical Biodiversity Areas or Ecological Support Areas in a bioregional plan published in terms of the National Environmental Management: Biodiversity Act, 2004; (l) areas containing ecosystems listed as threatened in terms of the National Environmental Management: Biodiversity Act, 2004; (m) within at least five kilometres of wetlands, pans, seepage zones, riparian areas and ephemeral watercourses, as defined in the National Water Act, 1998; (n) areas identified as containing groundwater-dependent ecosystems, including springs, wetlands, riparian vegetation and terrestrial ecosystems reliant on subsurface water; (o) identified aquifer recharge and discharge areas, including artesian and semi-confined aquifer systems; (p) areas identified as ecological corridors or biodiversity connectivity areas in provincial or national biodiversity plans;

Section/ Regulation	Current formulation	Comment/ suggested change
	Management: Protected Areas Act, 2003 (Act No. 57 of 2003); (c) the Sutherland Central Astronomy Advantage Area identified in figure 1 of Government Notice No. 199 published in Government Gazette No. 37434 on 12 March 2014; (d) the Karoo Central Astronomy Advantage Area 3 described in paragraph 3(4) of the schedule and identified in figure 1 of Government Notice No. 198 published in Government Gazette No. 37434 on 12 March 2014; (e) ten kilometres of the protection corridors containing the Square Kilometre Array radio astronomy stations identified in Annexure A to Schedule A of Government Notice No. 1411 published in Government Gazette No, 41321 on 15 December 2017; (f) five kilometres of any government waterworks and dams with a safety risk;	(g) areas identified as climate refugia or priority areas for ecosystem resilience under national or provincial climate adaptation strategies; and (r) areas identified as priorities in the most recent National Biodiversity Assessment or National Protected Area Expansion Strategy.'

Section/ Regulation	Current formulation	Comment/ suggested change
	(g) within a strategic water source area as identified on the national web based environmental screening tool and within five kilometres of the edge of such strategic water source areas; (h) five kilometres from the edge of towns and highly populated areas; and	
	(i) five kilometres from the edge of a thermal or cold spring.	Springs Prohibited Areas: Springs Prohibited Areas unlike with SWSAs, the Exploration and Production Regulations inexplicably do not prohibit these operations within thermal and cold springs (only 5 kilometres from their edges). The Regulations must clearly prohibit fracking within springs. We suggest the following wording: '(i) five kilometres from the edge of a thermal or cold spring and within springs.'
Regulation 6: Restricted areas	(1) Subject to subregulation (2) the exploration and production of a petroleum resource using fracturing may not take place in the following geographical areas: (a) within five kilometres from the edge of an existing or proposed municipal wellfield, including its aquifer, water supply boreholes and groundwater supply infrastructure; (b) in the area located outside of the Karoo Central Astronomy	There are two areas that are restricted, namely within 5km of a municipal wellfield (a), and areas relating to the Karoo Central Astronomy Advantage Areas (b). We take issue with (a) in that subregulation (2) essentially undoes the protection afforded municipal wellfields. Municipal wellfields are designated areas of land containing a group or cluster of, usually closely spaced, boreholes (wells) that work collectively to extract large quantities of groundwater from a common aquifer system. These systems are used by local governments or utility companies to supply water to public water systems for residential, industrial, and commercial use. They are therefore a vital component of water security and the rights contained in sections 24 and 27 of the Constitution. Considering the risks outlined above in relation to fracturing and the impacts on water systems, including contamination (of a finite resource), this should not be subject to mitigation. The consequence of subregulation (2) is to endanger the public's water by merely mitigating (as opposed to removing) the risks involved. This is unconstitutional and unlawful (in terms of NEMA and the NWA). We therefore recommend the removal of subregulation (2) from Regulation 6.

Section/ Regulation	Current formulation	Comment/ suggested change
	Advantage Area 3, but within the boundaries of the Karoo Central Astronomy Advantage Area 1 described in paragraph 3(2) and 3(4) of the Schedules and identified in figure 1 of Government Notice No. 198 published in Government Gazette No. 37434 on 12 March 2014. (2) The competent authority may authorise the activities contemplated in subregulation (1), based on a motivation and supporting evidence that demonstrate that environmental impacts can be avoided or adequately mitigated in the geographical areas contemplated in subregulation (1), and subject to approval from the relevant authority responsible for the management of the areas contemplated in subregulation(1), which approval must be obtained prior to submitting the applications for environmental	

Section/ Regulation	Current formulation	Comment/ suggested change
	authorisation contemplated in subregulation 8(1), 8(7) and 8(13)(a):	
	(2) The competent authority may authorise the activities contemplated in subregulation (1), based on a motivation and supporting evidence that demonstrate that environmental impacts can be avoided or adequately mitigated in the geographical areas contemplated in subregulation (1), and subject to approval from the relevant authority responsible for the management of the areas contemplated in subregulation(1), which approval must be obtained prior to submitting the applications for environmental authorisation contemplated in subregulation 8(1), 8(7) and 8(13)(a):	There is a grammatical error with the ending of the sentence with ":". Recommend changing to a full stop.
Regulation 7: Environmental obligation of an applicant or holder	Generally.	There is a lack of specificity or development. This regulation instructs applicants to identify, assess, avoid and if avoidance is not possible, to mitigate, manage and monitor all potential environmental impacts. They speak to "environmental attributes", however, no indication is given as to what these are, what should be measured, what standards should be applied, etc.
	Every applicant and holder has an obligation to—	The Regulations regulate onshore seismic surveys, requiring them to be done prior to the commencement of operations requiring the use of fracturing technology (see Regulation 8(1)). For

Section/ Regulation	Current formulation	Comment/ suggested change
	(a) identify, assess, avoid and if avoidance is not possible, to mitigate, manage and monitor all potential environmental impacts that may arise from exercising an exploration or production right for onshore petroleum requiring the use of fracturing technology;	consistency with Regulation 8(1), a reference to onshore seismic surveys which require an exploration right must be included in this (a) obligation. Suggested wording: "(a) identify, assess, avoid and if avoidance is not possible, to mitigate, manage and monitor all potential environmental impacts that may arise from exercising an exploration right through an onshore seismic survey or exercising an exploration or production right for onshore petroleum requiring the use of fracturing technology;"
Regulation 8: Submission of applications and implementation of monitoring plans	Regulation 8 generally. (4) The holder must submit to the competent authority, prior to commencement of exploration operations contemplated in subregualtion (8)(1), proof of the availability of the financial provision;	There is a spelling error "subregualtion" must read "subregulation".
	(5) On commencement of the exploration operation contemplated in subregulation (8)(1), the holder must– (a) commence with the implementation of the baseline monitoring plan; and (b) continue the required monitoring for a period of no less than twenty four months.	Baseline monitoring, rehabilitation after fracking, and monitoring after fracking or well decommissioning are insufficiently dealt with in the Regulations. Where any periods for baseline monitoring are set, they concern surface water monitoring for a period of 24 months (see also regulation 3.1.2 of the "Baseline Monitoring Regulations"). Specific ecological rehabilitation stipulations are lacking, and those for monitoring after hydraulic fracturing has ceased, concern seismic activity (Appendix 1, s.10.2 "Exploration and Production Regulations").
	(9)(viii) the drillilng fluid to be used;	Spelling issue: "drillilng" is meant to read "drilling".

Section/ Regulation	Current formulation	Comment/ suggested change
	(10) The holder must, prior to commencement, submit proof of the availability of the financial provision.	This regulation is unclear in two ways – 1) It is unclear prior to commencement of which operation proof of availability of the financial provision must be submitted. The Regulations must clarify which operations must be preceded by the submission of this proof. 2) It is unclear to which body the holder must submit proof of availability of the financial provision to. For consistency with Regulation 7(4) the regulation must provide for it to be submitted to the competent authority.
	(12) Throughout the exploration operation contemplated in subregulation (7), the holder must provide the monitoring results in the form of integrated operational monitoring reports, which comply with the approved integrated operational monitoring plan contemplated in subregulation 9(c)(ii), to the competent authority, designated agency and the Minister responsible for water affairs at intervals which comply with the approved integrated operational monitoring plan.	This subregulation is very unclear and requires simplification. In its current form, it seems to suggest that monitoring results are required to be given to the relevant authorities at intervals provided for in the right holder's integrated operational monitoring plan ("IOMP"). However, the IOMP itself does not require timeframes/ intervals to be set. This leaves a gap or loophole of when the holder is required to report. Considering the importance of monitoring data, particularly to health and safety, this is a considerable gap.
	(16) Prior to commencement of the production operations the holder must submit proof of the availability of the financial provision.	It is unclear to which body the holder must submit proof of availability of the financial provision to. For consistency with Regulation 7(4) the regulation must provide for it to be submitted to the competent authority. Suggested wording:

Section/ Regulation	Current formulation	Comment/ suggested change
		(16) Prior to commencement of the production operations the holder must submit proof of the availability of the financial provision to the competent authority.
	(17) Throughout the production operation, the holder must provide the monitoring results in the form of integrated operational monitoring reports, which comply with the approved integrated operational monitoring plan contemplated in subregulation (14)(c)(ii), to the competent authority, designated agency and the Minister responsible for water affairs at intervals which comply with the approved integrated operational monitoring plan.	See comment above for subregulation 12. The concerns for subregulation 12 are similar to our concerns about subregulation 17.
Regulation 14: Well examination	(1) The holder must subject the design, construction, operation, and decommissioning of exploration and production wells to an independent well examination undertaken by an independent well engineer and send the endorsement from the well examination to the designed agency.	Spelling issue: “designed agency” is meant to read “designated agency”.
	(3) The holder must keep a well file, which can be an	Keeping records and reports on an electronic filing system must be the default. This would provide consistency with Regulations 16(1)(c) and (d), and 20(1)(b). In addition, there are access to

Section/ Regulation	Current formulation	Comment/ suggested change
	electronic filing system, which identifies the—	information obligations which the operator and state entity must comply with, making electronic systems *de facto* necessary. Suggested wording: '(3) The holder must keep a well file, which ~~can~~ must be kept on an electronic filing system, which identifies the—'
Regulation 16: A holder's responsibility to notify and provide information to the designated agency and the Minister responsible for water affairs	(1) The holder must— (a) ensure that verification inspections, by the designated agency, are undertaken for the following actions before commencement: i. setting of a casing; ii. commencing with cementing of casings; iii. formation pressure integrity testing; iv. conducting a blowout prevention test; and v. mechanical integrity testing.	The duty of the designated agency to do verification inspections is framed here only as a duty on the holder to ensure that the designated agency does so. The Regulations do not include a separate regulation directly requiring the designated authority to do so. For the designated agency's accountability and ease of reference, this duty to do verification inspections should also be reflected in Regulation 19 (Powers and duties of the designated agency). Suggested wording for new subregulation in Regulation 19: 'The designated agency must undertake verification inspections for the following actions before commencement: i. setting of a casing; ii. commencing with cementing of casings; iii. formation pressure integrity testing; iv. conducting a blowout prevention test; and v. mechanical integrity testing.'
	(1) The holder must— (e) submit to the designated agency within 5 days after the testing was undertaken for information, the records and overall summary of the mechanical integrity tests which information must include:	It is unclear what information the testing was undertaken for. The sentence needs to be rephrased so that it is clearer what is being talking about and what is required.
	(1) The holder must— (e) submit to the designated agency within	The source of the water should also be disclosed. Suggested wording:

Section/ Regulation	Current formulation	Comment/ suggested change
	5 days after the testing was undertaken for information, the records and overall summary of the mechanical integrity tests which information must include: i. type and volumes of water sources for fracturing operations; ii. volumes and rates of fracturing fluid pumped into the target zone; and iii. volumes and release of flowback received during and after each fracturing event.	'(1) The holder must— (e) submit to the designated agency within 5 days after the testing was undertaken for information, the records and overall summary of the mechanical integrity tests which information must include: i. the water source (where the water was taken from); ii. type and volumes of water sources for fracturing operations; iii. volumes and rates of fracturing fluid pumped into the target zone; and iv. volumes and release of flowback received during and after each fracturing event.'
	(1) The holder must - (f) notify the competent authority, the designated agency the Minister responsible for water affairs and the heritage authority, in writing, at least fourteen days before commencing with the exercising of the exploration or production right, which notification must indicate the proposed date of commencement.	It is unclear of what the holder must notify (of the commencement date?). Clarification in this regard is needed.
	(1) The holder must - (f) notify the competent authority, the designated agency the Minister responsible for water	Grammatical error (comma missing), should read: '(1) The holder must - (f) notify the competent authority, the designated agency, the Minister responsible for water affairs and

Section/ Regulation	Current formulation	Comment/ suggested change
	affairs and the heritage authority, in writing, at least fourteen days before commencing with the exercising of the exploration or production right, which notification must indicate the proposed date of commencement.	the heritage authority, in writing, at least fourteen days before commencing with the exercising of the exploration or production right, which notification must indicate the proposed date of commencement.'
Regulation 17: Post-fracturing well report	(1) The holder must, within 90 days after fracturing has been completed, compile a detailed postfracturing well report for each well fractured and submit the report for review and archiving to the designated agency and the Minister responsible for water affairs.	It is unclear what is meant by "each well fractured". Suggest removing "fractured". In addition, merely submitting the report for "review and archiving" removes the report of any meaning, in that it implies that the designated agency and the Minister responsible for water affairs cannot take any action should the report require action, particularly sanctions or remedial action. To state otherwise usurps the Minister's (in particular) powers and functions, which is unlawful. Lastly, the person compiling the post-fracturing well report must be an independent well engineer. This is both necessary and consistent with the rest of the Regulations. Therefore, we suggest the following wording: '(1) The holder must, within 90 days after fracturing has been completed, compile a detailed postfracturing well report for each well ~~fractured~~ and submit the report for review, remedial action (where necessary) and archiving to the designated agency and the Minister responsible for water affairs for the application of their minds to the matter. The post-fracturing report must be conducted by and compiled by an independent well expert at the expense of the holder.'
	(2) A post-fracturing well report must include as a minimum- (i) the chemical composition of gases released from wells;	This should include estimated quantities of gases released, including fugitive gases. Suggested wording: '(i) the chemical composition of gases released from wells, as well as estimates of the quantities, including any fugitive gases released through the fracturing process, well construction and during operation;'
	(2) A post-fracturing well report must include as a	This should also include an explanation of the impacts.

Section/ Regulation	Current formulation	Comment/ suggested change
	minimum- (j) an explanation of operational or design variations to the pre-fracturing design;	Suggested wording: '(j) an explanation of operational or design variations to the pre-fracturing design, and the impacts of these variations;'
	(2) A post-fracturing well report must include as a minimum-	Any contamination in ground- or surface water should be disclosed. Any incidents and non-compliance should also be listed in the post-fracturing well report. Suggested wording: '(l) steps taken as a result of any identified induced seismic events or activity; ~~and~~ (m) plans to continue micro-seismic monitoring~~.~~; (n) any contamination of groundwater or surface water, and the source of the contamination; and (o) any incidents and/or non-compliance during construction and operation.'
Regulation 18	(1) A holder must— (a) appoint a well engineer to be responsible for the day-to-day management of the operations; and	It is unclear from this provision at what stage a holder must appoint a well engineer. (2)(b)(ii) of Appendix 3 clarifies that this appointment must be made prior to the commencement of the exploration or production operations, but for the reader's ease of reference, Regulation 18(1) should refer to Appendix 3. Suggested wording: '(1) A holder must— (a) at the stage contemplated in paragraph (2)(b)(ii) of Appendix 3 appoint a well engineer to be responsible for the day-to-day management of the operations; and'
	(5) Remedial action must be undertaken immediately and the designated agency must be satisfied with the remedial actions prior to issuing a written consent for the recommencement of operations.	Environmental harm requiring the immediate remedial action contemplated in this subregulation (for example blowout or the contamination of groundwater) may be catastrophic. The immediate remedial action required may therefore be costly. The Regulations do not require provision to be made at the outset for funding this possible action. While Regulation 7(g) requires holders to provide funding for the decommissioning, rehabilitation and closure of the exploration and production operations, this does not include funding for remedial measures during fracturing operations. For consistency with the precautionary principle, the Regulations require financial provision to be made for the immediate remedial action contemplated in this subregulation.

Section/ Regulation	Current formulation	Comment/ suggested change
Regulation 19	(1) The designated agency must provide approvals or request additional information within 5 days of receiving information for approval, unless there is a requirement for concurrence with the Minister responsible for water affairs, in which case the approval or request for additional information is required within 10 days after the concurrence request is made.	As discussed above, this subregulation provides for too little time for the designated agency and Minister responsible for water affairs to meaningfully engage with the documents to be approved. The time periods in this subregulation should be extended to allow for meaningful engagement before approval.
	(2) Where the concurrence of the Minister responsible for water affairs is required and not provided within the timeframe contemplated in subregulation (1), it will be deemed that approval is given;	As discussed above, this subregulation unlawfully usurps the important function of the Minister responsible for water affairs, and should be removed. It is also inconsistent with purpose of the Regulations in Regulation 2(f) to "give effect to the coordination between decision-making authorities on the requirements for baseline monitoring, public participation, impact assessment requirements and integrated operational monitoring". It should therefore be removed.
Regulation 20	(1) The holder must upload on its website, which must be publicly accessible— (a) all monitoring and reporting information including the audit reports; (b) all well information contained in the well file contemplated in regulation 14(3); (c) the following documentation regarding	As discussed above, to ensure meaningful transparency and access to information, the Regulations must require a centralised database of this information on the DFFE and/or designated agency's website.

Section/ Regulation	Current formulation	Comment/ suggested change
	fracturing fluids as considered through the consolidated assessment report as well as any additions as authorised by the designated agency during fracturing operations: i. the hazard status of the substance; ii. material safety data sheet information for substances; iii. anticipated volumes of fracturing fluid, including proppant, base carrier fluid and each chemical additive to be used within the operation per year for the duration of the fracturing operations; iv. the trade name of each additive and its general purpose in the fracturing process; v. each chemical intentionally added to the base fluid, including the chemical make up, and if applicable the actual concentration to be used in percentage or by mass; and vi. the possible risk of the chemicals and additives to	

Section/ Regulation	Current formulation	Comment/ suggested change
	the environment and water resources.	
Regulation 21: Temporary well suspension, well decommissioning and monitoring	(1) The holder must— (a) decommission an exploration or production well within 180 days after the final use thereof;	This potentially means that a well is abandoned for up to 3 months, which can lead to deterioration of the well and consequent contamination, etc. Decommissioning should happen immediately and not later than 30 days after final use. In addition, as stated above, “final use” should be defined (see suggested definition). Suggested wording: ‘(1) The holder must— (a) begin the decommissioning an exploration or production well immediately after the final use thereof, and no later than ~~within 180~~ 30 days after the final use ~~thereof~~;’
	(1) The holder must— (b) where temporary suspension of an exploration well is required, suspend such well for a period not exceeding 180 days from the day on which the exploration well was suspended;	This regulation is unclear in three respects: - Firstly, it is unclear what needs to happen while the well is suspended. This must be stated. - Secondly, it is unclear what conditions need to be present for the temporary suspension of an exploration well to be “required”. These conditions must be set out. - Thirdly, it is unclear what happens after the 180 days (360 days for production wells) where the reason for the suspension have not been addressed or adequately addressed, as well as who makes such determinations. Where other draft regulations deal with this, this should be stated in the regulations in the Exploration and Production Regulations that are directly implicated so that they can be cross-referenced for clarity. Alternatively, and preferably, a regulation within the Exploration and Production Regulations should be added that deals with these issues.
	(1) The holder must— (c) where temporary suspension of a production well is required, suspend such well for a period not exceeding 360 days from the day on which the production well was suspended ;	It is unclear why there are two sets of time periods for exploration wells and for production wells. In addition, the same issues that are present for Regulation 21(1)(b) are present for this regulation. See the above comment for suggested remedies to this lack of clarity.

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	(2) A holder may only suspend a well— (b) for a period determined by the designated agency, which period may not exceed the timeframes as contemplated in subregulation 21(1)(b) and (c).	Similarly to the above, it is unclear what happens if the suspension period has been exceeded but the cause of the suspension has not been addressed or adequately addressed. This needs to be spelt out, as well as the consequences for negligence and/or non-compliance.
Regulation 23: Offences	A holder commits an offence if that person contravenes or fails to comply with regulation 4, 5, 6, 8(5)(a), 8(5)(b), 8(11), 8(12), 8(15), 8(17), 9, 10, 12, 13, 14(1), 14(3), 15(1), 16(1)(a), 16(1)(f), 17(1), 18(1), 18(2), 18(3), 18(4), 18(5), 20 or 21 of these Regulations.	While we are heartened that contravention or failure to comply with various provisions of these Regulations is an offence, there are a few provisions that are missing from Regulation 23. In particular, the following: - Regulation 7, which deals with the environmental obligations of applicants or holders. Some of these obligations include managing, monitoring, etc. environmental impacts, compiling information so that informed environmental decisions can be made, decommissioning and rehabilitation obligations, etc. These are all fundamental to the purpose of the Regulations and to avoiding environmental harm. Should they come with no consequences for contravention or non-compliance, they are mere words with little force and effect.
		- Regulation 15(2) requires the designated agency to obtain the concurrence of the Minister responsible for water affairs, prior to the approving the commencement of fracturing operations. This is an important step. Non-compliance should therefore be an offence so as to ensure that approval is sought, particularly considering fracturing's impact on water.
		- The whole of Regulation 16 should be an offence for non-compliance. Without this information, the relevant authorities cannot take action that might be needed and fulfil its obligations. The consequences for the environment and people could be dire.
		- It is not clear why Regulation 17(1) is an offence, but the substance of 17(1) – Regulation 17(2) – is not. Non-compliance with Regulation 17(2) should also be an offence.
		- Regulation 22(3)(a) requires a holder to allow access to the operation and any relevant documentation, to conduct any activities associated with compliance monitoring and

Section/ Regulation	Current formulation	Comment/ suggested change
		enforcement and independent verification to relevant departments, agencies and other bodies. Without this, these bodies will be hamstrung, and a holder can frustrate efforts to lawfully regulate. Contravention of this provision, particularly intentional contravention, should be an offence. - Similarly, the holder's duty to ensure that data used for analysis is presented, retained and made available to relevant authorities and stakeholders in Regulation 22(3)(b) should result in penalties should it be contravened or not complied with. The consequences of non-compliance or contravention could result in environmental harm and harm to people without accountability. Therefore, this should be an offence under Regulation 23.
Appendix 1: Well Construction Standards	Generally, across Appendix 1.	Appendix 1 appears to focus primarily on technical feasibility, engineering controls and operational planning, but does not require a mandatory biodiversity sensitivity screening prior to site selection. Without early biodiversity screening well pads, access roads, pipelines and associated infrastructure may be located in Critical Biodiversity Areas, ecological corridors, or intact habitat. Appendix 1 should require a biodiversity sensitivity map based on: - the National Web-Based Environmental Screening Tool; - provincial biodiversity plans; - Critical Biodiversity Areas and Ecological Support Areas; and - threatened ecosystem listings under NEMBA.
	Generally and section 1(2): The holder must plan for multi-well pads and horizontal drilling technologies in order to optimise the spacing between neighbouring wells and minimize cumulative surface impacts of the operation.	Avoidance, which is the primary mitigation measure under NEMA, is not enabled. Suggested wording: '(2) The holder must plan for multi-well pads and horizontal drilling technologies in order to <u>maximise</u> the spacing between neighbouring wells and <u>avoiding</u> cumulative surface impacts of the operation.'
Appendix 2: Prohibited substances	The following substances will not be allowed as additives to fracturing fluids	While excluding harmful chemicals is welcomed, as discussed above, this should not be a closed list as it likely excludes various chemicals that would also be harmful. In addition, it does not account for compounds created by the addition of two chemicals not listed and that would otherwise be innocuous, but when combined are harmful.

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	(see list on Appendix 2)	In addition, it is unclear if the listed chemicals are so listed due exclusively to their harmful nature towards humans, or inclusive of harm towards other organisms that could be harmful to ecosystem functioning and/ or to species.
Appendix 3	(1) The following conditions are applicable to an environmental authorisation granted for applications contemplated in subregulation 8(1): (d) The independent environmental control officer will have, amongst others and as a minimum, the duty to: (i) prepare and maintain a project file which contains the following information as a minimum; (dd) details including the certification of the accredited laboratories to which samples are to be sent;	It is unclear what details must be recorded other than the certification of the accredited laboratories to which samples are to be sent. It must be clarified what other types of details are required. This should also be made available on the holder's website and the designated agency's/DFFE's website.
	(2)(d) The independent environmental control officer will have the duties identified in paragraph (1)(d) and the following additional duties as a minimum: … (ix) prepare a quarterly audit report which must, as	For transparency, Appendix 3 should require the incident register in paragraph (1)(d)(iii) to be included in the quarterly audit report. This will also result in the incident register being publicly available in terms of Regulation 20(1)(a). Appendix 3 at paragraph (2)(e)(vii)(jj) provides for the reporting of incidents by the well engineer. Incidents should also be reported within a specified timeframe and communities and landowners in the surrounding areas should be notified immediately.

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	a minimum, include the following: (aa) the period of the audit; (bb) compliance with the environmental management programme impact management outcomes and actions; (cc) compliance with undertaking the monitoring requirements of the baseline monitoring plan as relevant; (dd) document any audit findings issued; and (ee) corrective measures for audit findings;	
	(2) The following conditions are applicable to the issuing of an environmental authorisation contemplated in regulation 8(7) and 8(13)(a): (a) The holder must notify the compliance unit of the competent authority, the designated agency, the relevant heritage resource authority and the Minister responsible for water affairs fourteen days before the commencement of the exploration operations or the continuation of exploration	Appendix 3 should also provide for notification of the affected landowners and communities.

Section/ Regulation	Current formulation	Comment/ suggested change
	activities into production operations, to facilitate compliance inspections.	
Appendix 4	Generally, across Appendix 4.	Water quality limits may not be protective of aquatic biodiversity, in that it sets concentration limits for discharge and irrigation but does not explicitly state that these limits are derived from thresholds protective of aquatic ecosystems and biodiversity. Compliance with numeric discharge limits does not necessarily prevent ecological harm. Even low concentrations of salts, metals, hydrocarbons, and fracking-related chemicals can alter aquatic community structure, affect the reproductive success of aquatic organisms, disrupt microbial and invertebrate assemblages, and cause long-term toxicity in sediment and biota. In arid systems such as the Karoo, aquatic ecosystems are naturally fragile and species are often adapted to narrow chemical ranges. Discharge to land (irrigation with wastewater) can result in infiltration into shallow aquifers, contamination of springs and seeps, and long-term accumulation of salts and toxic substances. This can lead to, *inter alia,* vegetation die-off, loss of spring-associated biodiversity, degradation of riparian and wetland habitats. Moreover, Appendix 4 does not address that the Regulations, as they currently stand, encourage reuse of contaminated water. In this way it ignores the cumulative effect of this (from a chemical perspective, as chemical concentrations increase), particularly when this water is reintroduced, including through irrigation. Appendix 4 should explicitly state that water quality limits must be protective of aquatic ecosystem health, ecological reserve requirements under the National Water Act, and downstream biodiversity and ecosystem functioning.
	Generally, across Appendix 4.	Risk of bioaccumulation and chronic ecotoxicity are not addressed. Appendix 4 appears to regulate based on concentration limits at point of discharge but does not explicitly consider bioaccumulation, sediment contamination, and long-term chronic exposure effects. Many fracking-related contaminants (e.g. heavy metals, hydrocarbons) can accumulate in aquatic organisms, persist in sediments, move up food chains, and affect birds, amphibians, and mammals dependent on aquatic systems. Even short-term compliance may therefore mask long-term biodiversity harm.

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		Appendix 4 should require that water quality limits be set and applied in a manner that prevents bioaccumulation, chronic toxicity, and sediment contamination.
	Generally, across Appendix 4.	Irrigation with wastewater presents direct ecological risks. The allowance for irrigation with wastewater creates a pathway for contamination of terrestrial ecosystems that depend on clean groundwater and soils. In the Karoo, where ecosystems are water-limited and slow to recover, such impacts may be significant and permanent. Appendix 4 should: - restrict irrigation where there is risk to natural vegetation; - require proof that irrigation will not alter soil chemistry in a way that harms indigenous biodiversity; - require monitoring of soil and vegetation condition; and - prohibit discharge where ecological risk cannot be confidently excluded. In addition, Appendix 4 should require assessment of: - cumulative pollutant loading; - long-term soil and water salinity trends; and - ecological thresholds beyond which biodiversity impacts occur.
	Generally, across Appendix 4.	Lastly, Appendix 4 does not clearly state that discharge must not compromise the ecological reserve under the National Water Act.
	Temperature (°C) 17-30°C (depends on the type of fish species that is there)	It is unclear why fish are the only species of concern here. There are various ecologically significant species that are affected by changes in temperature.

CONCLUSIONS AND RECOMMENDATIONS

189. The proposed Regulations are a step toward regulating onshore petroleum activities involving hydraulic fracturing, but in their current form they are incomplete and insufficient to ensure constitutionally compliant environmental protection. Several provisions lack clarity, enforceability, or alignment with existing environmental governance frameworks, particularly the NEMA principles (particularly the precautionary principle) and integrated decision-making requirements.

190. The Regulations do not adequately address cumulative, long-term, and indirect environmental risks associated with fracking, including impacts on water resources, biodiversity, ecosystem integrity, and climate commitments. Dr Carrick's opinion concludes that one of the main risks that arises is from the cumulative footprint of many wells and associated infrastructure across large areas. Even where the direct footprint is small, a large proportion of the landscape falls within ecological influence zones.[189] This has not been accounted for. Further, baseline monitoring periods are too short to detect long-term changes. In his words, he warns:

> "*All the regulations are focused on impacts at the well-pad site scale. Individually these may have low impacts on terrestrial biodiversity, collectively however all the drill sites and their supporting infrastructure will undoubtedly have a very high impact on terrestrial biodiversity and the ecology of the region. It is the cumulative impacts of hydraulic fracturing that must be addressed as these will have both a very high likelihood, and a very high impact, of harm to the Nama Karoo and surrounding biomes*."[190]

> "*Loss of connectivity, edge effects and disruption of ecological processes associated with a network of linear structures (such as roads, powerlines and pipelines) are likely to undermine the biodiversity integrity of the region*."[191]

191. Important governance gaps remain in relation to institutional roles, monitoring, compliance, and enforcement, which could undermine effective oversight and accountability. Key safeguards appear to be deferred to future processes, guidelines, or discretionary decisions, creating legal uncertainty and weakening preventative environmental protection. Public participation, transparency, and access to information mechanisms are not consistently or robustly embedded across the regulatory framework.

192. Without strengthening, the Regulations risk enabling high-risk activities in sensitive and water-stressed environments without adequate scientific certainty, baseline data, or clear thresholds for refusal. The consequences could be dire:

> "*The likelihood of adverse impacts on groundwater arising from shale gas extraction remains uncertain. However, should such impacts occur, their consequences for biodiversity and ecosystem functioning would be severe and potentially irreversible*."[192]

193. Comparative international practice demonstrates that jurisdictions with strong water-law frameworks prohibit or restrict hydraulic fracturing primarily through ecosystem-based water protection, rather than reliance on mitigation and monitoring alone. International practice confirms that ecosystem protection, precaution, and non-deterioration principles are central to lawful regulation of fracking. South Africa's constitutional and statutory framework is at least as protective as these regimes. The proposed Regulations, which permit fracking without Reserve determination or ecosystem-based constraints,

[189] For example, within 500 m–1 km of infrastructure.
[190] Peter Carrick, Biodiversity opinion (2026), page 3, attached to this submission.
[191] Peter Carrick, Biodiversity opinion (2026), page 4, attached to this submission.
[192] Peter Carrick, Biodiversity opinion (2026), page 6, attached to this submission.

are therefore inconsistent not only with domestic law but also with credible international norms. In this regard, the proposed Regulations fall below international best practice standards.[193]

194. Based on the above submissions, the Regulations should be withdrawn and substantially revised. No hydraulic fracturing should be permitted unless and until independent, peer-reviewed evidence demonstrates that water ecosystems can be protected in practice. At a minimum, the Regulations must mandate ecosystem-based assessments, Reserve determinations, and a precautionary prohibition where uncertainty persists. Anything less would amount to unlawful risk-shifting onto water ecosystems and future generations. This would be in direct contravention of the state's constitutional obligations to protect the rights of the people of South Africa, and the duty of care embodied in section 28 of NEMA.

195. Additional recommendations include:

    195.1. The most effective mitigation measure for reducing biodiversity impacts from wastewater is to avoid the use of open storage ponds altogether. Instead, wastewater should be stored and transported in closed, leak-proof containers and treated or disposed of in accordance with stringent environmental standards. Continuous monitoring, robust regulatory oversight, and the application of the precautionary principle are essential.[194]

    195.2. The DFFE should envisage and updated for SEA for any future area identified shale gas development, and potentially that this integrates with, and leads to a Biodiversity Management Plan for Ecosystems (BMP-E), by which the region is managed to minimise and mitigate impacts to biodiversity. Recent SEA processes conducted for solar and wind development could provide insight and experience developing the Regulations to address the cumulative impacts.[195]

196. Based on the above, the Regulations are unlawful in that they fail to address cumulative impacts in any meaningful or enforceable manner. This failure:

    196.1. Contravenes NEMA's express requirements;

    196.2. Undermines protection of water ecosystems and biodiversity;

    196.3. Facilitates incremental and irreversible ecological harm;

    196.4. Renders individual authorisations legally vulnerable.

197. It is submitted that hydraulic fracturing cannot lawfully be authorised in the absence of a prior, independent, region-wide cumulative impact assessment that demonstrates, particularly on a precautionary basis, that ecological thresholds will not be exceeded, as well as the guarantee of human safety.

198. Kindly advise as to whether oral hearings will be held in respect of these Regulations and if so, the details of such hearing.

199. Please do not hesitate to contact us if you require further information or clarity on these submissions.

[193] For example, the European Union's Water Framework Directive (2000/60/EC) establishes binding obligations to prevent deterioration of all water bodies and to achieve "good ecological status." Fracturing activities may not proceed where they risk deterioration of groundwater or dependent ecosystems. Importantly, the Directive requires assessment of hydrological connectivity, cumulative impacts, and long-term ecological functioning, not merely chemical compliance. In Case C-461/13, *Bund für Umwelt und Naturschutz Deutschland v Germany* (Weser case), the Court of Justice of the EU confirmed that authorisation must be refused if an activity risks ecological deterioration, even where mitigation is proposed. States in Australia and the United States have also banned or strictly restricted fracking.
[194] Peter Carrick, Biodiversity opinion (2026), page 8, attached to this submission.
[195] Peter Carrick, Biodiversity opinion (2026), page 11, attached to this submission.

Yours faithfully,

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