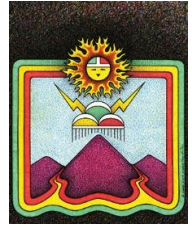


Springs Stewardship Institute

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Memorandum

To: UNECE Sustainable Energy Division

From: Springs Stewardship Institute

Date: 14 January 2024

Re: Comments on the Draft United Nations Framework Classification for Resources -
Supplemental Groundwater Specifications

Springs Stewardship Institute is a 501(c)3 global initiative based in Flagstaff, Arizona, whose unique mission is to improve scientific knowledge and management of spring ecosystems. Springs are places where groundwater reaches the earth's surface, and are often biologically, and culturally important subsurface-to-surface linked, groundwater dependent, headwater wetland ecosystems. Springs are globally abundant, with total numbers estimated in the tens of millions (Stevens et al. 2022), and often are important hotspots of endemic biological diversity (Fensham et al. 2023), cultural activity (Stevens et al. 2022), and ecological interactivity that greatly influence the ecological integrity of adjacent upland ecosystems (Stevens et al. 2021). In addition, springs are socio-economically critical focal points, supporting subsistence and urban water uses throughout the world, and generating far more than \$100 billion in revenue annually from geothermal energy production, balneotherapy resorts, and water bottling industries.

However, and despite their obvious importance, spring ecosystems are globally threatened by a host of human impacts, including non-sustainable groundwater extraction and pollution, and surface flow, quality, and habitat degradation. An increasing number of researchers and some governments have recognized springs degradation as a significant conservation crisis. In an effort to bring more attention to groundwater managers over the past 15 yr, SSI has provided a geomorphic classification system of springs' spheres of emergence, guidance on ecosystem rehabilitation, and assistance with mapping, inventorying, assessing, planning, implementation, and monitoring of springs to improve stewardship (Paffett et al. 2018; Sky Island Alliance and SSI 2016; Springer et al. 2015; Stevens et al. 2021).

The draft supplement to the Mineral and Anthropogenic Resources (draft Supplement; 2022) Guidance in the United Nations Economic Commission for Europe (UNECE) Sustainable Energy Division provides evaluation of the viability and feasibility of groundwater projects proposed by the Member States in Europe and elsewhere. Here we provide SSI's comments on the draft Supplement, in response to a global request for review.

SSI's concerns with the approach of the draft Supplement to evaluation of environmental impacts of mining and energy projects on groundwater include the following.

- 1) The definitions of what groundwater "is not" (draft Supplement: 8) are poorly worded.

"Groundwater sources do not include:

- Diversions of groundwater naturally discharging at the surface of the Earth at a spring or seepage face without connections to aquifers involved in groundwater projects.
- Water passively collected at surface as at a dugout or natural body of surface water, even when those sources are known to be supplied by groundwater."

Does the first bullet refer to augmentation of a project? Does the second bullet refer to anthropogenic capture of groundwater discharge or to natural surface accumulation of groundwater – it seems to imply that springfed limnocratic pools of water (subaqueous springs, *sensu* Stevens et al. 2021) are not considered to be groundwater, even when their waters have not yet reached the surface. These exclusions can otherwise be interpreted as excluding springs, which are mentioned solely in this context in the document, from consideration in project impact assessment, even though springfed pools, ponds, and lakes often are the targets of development.

- 2) The overall tone and language of the draft Supplement are focused on engineering projects, and the utilitarian language obscures and reduces attention away from the need for long-term protection of groundwater quality and quantity, and the integrity of springs, which are groundwater-dependent ecosystems (e.g., Cantonati et al. 2020). Ecosystems in general are treated spuriously and as commodities, rather than as essential support systems for sustainability of biodiversity and cultural integrity. The use of the word "resource" itself relegates groundwater to the role of a commodity, rather than a human right. The draft language therefore reduces the importance of groundwater and springs to concerns to matters of secondary or tertiary importance, a strategy that may result in a failure to grasp the significance of unforeseen impacts on groundwater supplies and quality, and thereby may threaten the ecological integrity of both the springs they support and the adjacent upland habitats in which the springs arise. Therefore, we consider as false the statement by the UNFC that it "...fully integrates social and environmental considerations and technology readiness required to bring clean and affordable energy resource projects into the market" (<https://unece.org/sustainable-energy/sustainable-resource-management/united-nations-framework-classification>). We recommend increased specificity and strengthening of the language about environmental concerns throughout the document.
- 3) The document draws an artificial boundary between groundwater and surface water that excludes recognition of the importance of the foundational linkage between the two at springs.
- 4) Attention to environmental issues in groundwater development by the UNFC apparently remains incomplete. From the description in "UNFC and Social and Environmental

Management” (<https://unece.org/unfc-and-social-and-environmental-management-0>), the environmental issues to be considered seem to solely focus on the economic viability of ecosystem services to humans, not support for overall ecosystem integrity, biodiversity, indigenous cultural values, and non-use values. We recommend that the UNECE complete internal development of its environmental guidelines with such elements considered, and do so promptly to ensure that the recommendations made in the draft Supplement are aligned with the agency’s broader goals and objectives.

- 5) The "big project" engineering approach described in the draft Supplement fails to recognize that tens to hundreds of millions of farms, ranches, settlements, towns and cities in borderlands, continental interiors, and throughout the world rely on springs for subsistence water supplies, subsistence that when it fails for even brief (a month to a year) periods threatens ecological, cultural, and economic integrity.
- 6) The time-frame for monitoring groundwater and springs exploitation projects differs from projects where deleterious changes can be more readily reversed. Often, by the time a change in groundwater level is detected, it is too late to easily reverse the degradation. Similarly, the first time a perennial spring goes dry will have the largest impact on its ecological integrity and potential for rehabilitation. Such differences in monitoring and feedback timeframes should be recognized in the draft Supplement.
- 7) Some projects may be designed to rehabilitate groundwater supplies and spring ecosystem integrity for the common good. Such projects should be strongly encouraged and not cast in the same context as resource exploitation projects. Unfortunately in the United States, such rehabilitative projects are not distinguished from exploitation projects, and often are subject to crippling costs of compliance that retard or prevent the project from occurring. We recommend that the EU not fall into this same trap, as groundwater supply and springs ecosystem rehabilitation are often urgent issues in which implementation delays can result in loss of critical habitat, populations, and human services.
- 8) There appears to be no consideration of biodiversity conservation here, as the term does not appear in the document. This lack that reflects the traditional emphasis on economics over ecological integrity, and is a serious short-coming of its supposedly holistic approach to assessment.
- 9) All of the above issues are likely to disproportionately negatively affect underprivileged individuals, populations, and nations, and while such considerations are referred to in the document, both the immediate and the long-term cultural and socio-economic consequences of exploitation projects often have been dire.
- 10) The evaluators of groundwater projects need to be collaborative and broadly trained as many of the above issues require considerable expertise in multiple disciplines and attention to subtle, long-term and diverse impacts on humans and nature.

Overall and in conclusion, we consider it important to elevate protection of the integrity of aquifers, groundwater, and the springs they support to the same status as the economic profits of proposed projects. If the agency is interested, we provide much information on inventory, assessment, management planning, and implementation on the SSI website at:

<https://www.springstewardshipinstitute.org>. Please let us know if you are interested in further discussion or trainings in relation to spring ecosystems.

We thank you for the opportunity to comment on the document, and hope our concerns will contribute to improvement of the draft Supplement.



Lawrence E. Stevens, PhD and Director

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