



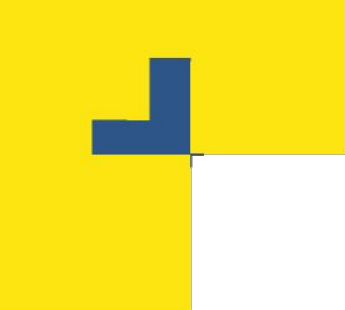
ICS ASTRA 3+1 WORKSHOP

Overview of Intergenerational Stewardship Culture, Including Long-Term Stewardship and Rolling Stewardship

Niels Henrik Hooge, NTW, Ljubljana, 28 May, 2026



Co-funded by the European Union under Grant Agreement n° 101166718



CONTENT OF THE PRESENTATION

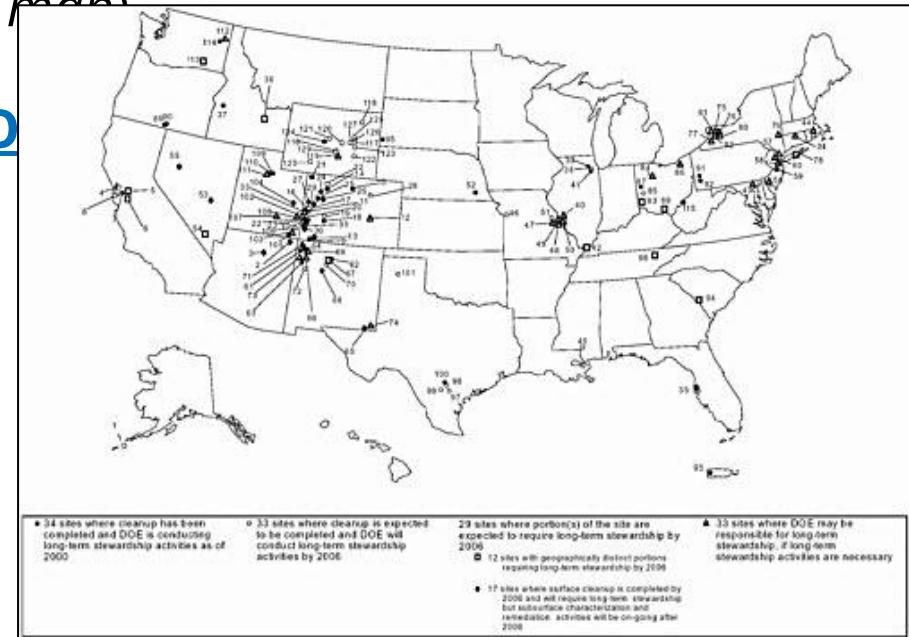
1. A preliminary definition of the notion of **intergenerational stewardship culture in a civil society perspective**.
2. A definition of **Long-Term Stewardship (LTS)**.
3. A definition of **rolling stewardship** in strong and weak versions .
4. Examples of LTS and rolling stewardship in **current national, European and international law**, especially **with regard to UMMT**.
5. The **pros and cons** of intergenerational stewardship culture
6. Suggestions for **a way forward**.

DEFINITION OF INTERGENERATIONAL STEWARDSHIP CULTURE

- **A preliminary, generic definition of intergenerational stewardship culture in a civil society perspective:** *A long-term, systemic approach to an enlarged and shared safety culture for RWM and final disposal of RW that deals with uncertainties and risks by relying on pluralistic expertise and continuous knowledge transfer, considers security, and opens up to actors outside the frame of RWM, including civil society. Ideally, a long-term stewardship culture should include transparency, public participation and access to justice and resources for civil society in all phases of RWM. Furthermore, it is a dynamic concept that could manifest itself in different versions (not a “one size fits all”), but is still bound by ethical principles, primarily the precautionary principle. The concept includes long-term stewardship and rolling stewardship.*
- **For further information on the background of the definition:** Dewoghelaere J., Fontaine G., Hooze N. H., Mraz G., Wales C. (2024): [Synthesis report of WP UMAN outcomes from a civil society point of view](#). Final version of deliverable D10.17 of the HORIZON 2020 project EURAD. EC Grant agreement no: 847593.

DEFINITION OF LONG-TERM STEWARDSHIP (LTS)

- THE INITIAL BASIS OF INTERGENERATIONAL STEWARDSHIP CULTURE IS LTS.
- LTS is necessitated by the more than **140 sites** in the United States heavily contaminated by radioactive substances (*cf. the page*)
- Map of sites anticipated to require LTS by [DOE](#)



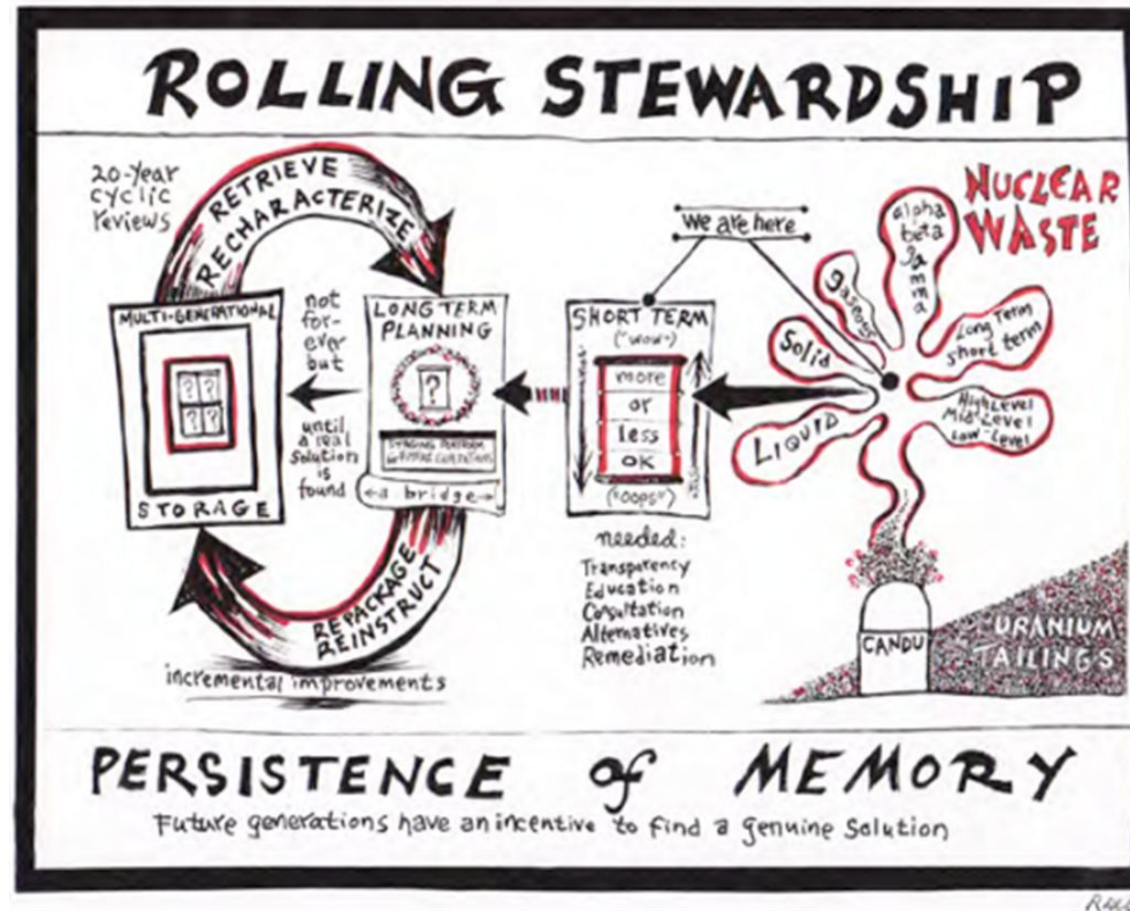
DEFINITION OF LONG-TERM STEWARDSHIP (LTS)

- The afore-mentioned sites are part of the legacy of nuclear-weapons production during the **Manhattan Project** and the **Cold War**.
- They continue to be **dangerous to the public health and the environment** and require management into an indefinite future.
- **The U.S. Department of Energy (DOE)** dubs its activities beyond closure of contaminated sites **long-term stewardship**.
- [DOE's DEFINITION OF LTS](#): *The physical and institutional controls, and other mechanisms needed to ensure protection of people and the environment at sites where plans have been developed to complete clean-up after site closure (e.g., landfill closures, remedial actions, removal actions, and facility stabilisation). This includes land-use controls, monitoring, maintenance, and information management.*

DEFINITION OF ROLLING STEWARDSHIP

- The author of rolling stewardship in its current form is **GORDON EDWARDS**, president of the *Canadian Coalition for Nuclear Responsibility (CCNR)*.
- Broadly speaking, it signifies an **intergenerational management concept** requiring monitoring and maintenance of the RW for an indefinite period of time, with responsibility being passed on from one generation to the next, preserving the possibility of retrieval, recharacterization and repackaging of the RW.
- It also requires a **mechanism for reinstructing the next generation**, providing detailed information on the RW and the associated hazards, and ensures that the next generation is fully aware of the need to spend time and money on the RW and if necessary, to see that corrective action is taken in a timely fashion.
- This process could last **until a final safe solution is found** which would no longer require constant care and memory.

DEFINITION OF ROLLING STEWARDSHIP



Gordon Edwards 2013

eurad²

DEFINITION OF ROLLING STEWARDSHIP

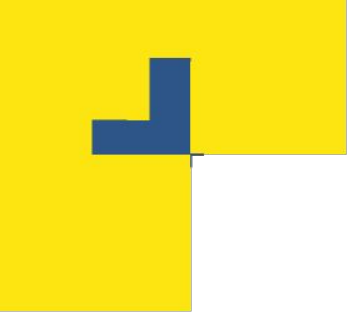
The Concept of Abandonment

1. Humans have never permanently disposed of anything.
2. Assumes a permanent solution to waste problem exists.
3. Monitoring the waste ceases after abandonment.
4. Retrieval is difficult or impossible.
5. Containers will inevitably disintegrate.
6. If leakage occurs timely corrective action is not likely.
7. Abandonment will eventually result in amnesia.
8. Difficulty in communicating to unknown future societies.
9. No intention to truly solve the problem of nuclear waste.

The Concept of Rolling Stewardship

1. Humans can contain waste securely for decades at a time.
2. Recognizes a solution to the problem does not yet exist.
3. Continual monitoring of waste is essential.
4. Retrieval is anticipated and actively planned for.
5. Periodic repackaging is an integral part of the process.
6. If leakage occurs timely corrective action will be taken.
7. Rolling Stewardship is based on persistence of memory.
8. Information is readily transmitted to the next generation.
9. Ongoing reminder that the problem remains to be solved.

Gordon Edwards 2013



DEFINITION OF ROLLING STEWARDSHIP

- **STRONG AND WEAK VERSIONS OF ROLLING STEWARDSHIP:**
- One could ask where LTS **ends** and rolling stewardship **begins**.
- Whether LTS constitutes a weak version of rolling stewardship, could be a question of terminology, but first and foremost **delineation of the two concepts**.
- Apart from the fact that LTS focuses on radioactive contamination and rolling stewardship mainly pertains to geological disposal of RW, there appears to be **more similarities than differences** between the two (*see figure on the next slide*).

WEAK AND STRONG VERSIONS OF ROLLING STEWARDSHIP

Parameters	Weak version	Strong version
Time horizon	Few human generations	Interminable
Scope	Final disposal of RW	Final disposal of all toxic, long-lived waste
Start-up	After closure of DGR	Before and after closure
Character	Reactive (mitigation)	Preventative
Continuity	Broken	Unbroken
Framework	Stop and go policies	Established institutional mechanisms
Normativity (statutory)	Allowed by law	Required by law
Safety	Not part of safeguards	Part of safeguards
Stakeholder involvement	No or little	Comprehensive
T&PP	Decide, announce, defend	Established institutional mechanisms
Funding	By subsequent generations	By the waste-producing generation(s)
Terminology	Semantically not different from LTS	Semantically very different from LTS

LEGAL IMPLEMENTATION OF ROLLING STEWARDSHIP

- **ROLLING STEWARDSHIP IN CURRENT NATIONAL, EUROPEAN AND INTERNATIONAL LAW:**
- **Very little implementation** of any strong version of rolling stewardship in current national, European and international law.
- However, by some rolling stewardship perceived as a succession of stewards tending to needs from one generation after another, the [U.S. DOE's Site Transition Framework](#) has been seen as **a step in this direction**, because it identifies documents that should be passed to new site owners or stewards.
- However, the Framework only ensures that a document is passed, **not that it contains what it is supposed to**, or that the relevant underlying information is available and accessible.

LEGAL IMPLEMENTATION OF LONG-TERM STEWARDSHIP (LTS)

- **Lack of implementation is not the case with LTS, especially in regard to U.S. national law and parts of European law.**
- **IN THE U.S.**, on a site-specific basis, **where residual hazards remain after nuclear clean-up activities**, management of any associated LTS is conducted in accordance with DOE Orders and guidance, Federal, State and local environmental and resource protection laws, and site-specific agreements between DOE and U.S. State and Federal environmental regulators.
- IN EUROPEAN LAW, LTS is not addressed because of the legacy of nuclear weapons production but is necessitated by **the many Uranium Mine and Mill Tailings (UMMT) sites** located in 12 of the EU MS. Subsequent EU Commission reports have concluded that there is a need for an effective set of measures for coordinated institutional control of UMMT, which only LTS can provide.

LEGAL IMPLEMENTATION OF LONG-TERM STEWARDSHIP (LTS)

- **AN EU COMMISSION STAFF WORKING PAPER** from 2011 recommends long-term measures and institutional mechanisms, which can be **perceived as a version of LTS and even rolling stewardship**.
- It calls for programmes that **integrate all measures under existing EC and national legislation** and take on board all closely interrelated managerial, societal, economic and technical aspects during the RWM decision-making process.
- Effective stewardship **should take into account continuing changes to social, technical and economic conditions and processes**, such as changing stakeholders, perceptions of risk, science and technology, societal structures, governmental systems, economic circumstances and priorities.
- The paper also views **knowledge preservation** as an essential prerequisite for a successful stewardship programme.

LEGAL IMPLEMENTATION OF LONG-TERM STEWARDSHIP (LTS)

- **QUOTE FROM THE PAPER:** (Its analysis) *“is expected to facilitate the discussion on the long-term regulatory and management approaches to uranium mining and milling waste in the context of the overall policy on radioactive waste management as an integral part of sustainable development of the nuclear fuel cycle. It will form a basis for the European High Level Group on Nuclear Safety and Waste Management (ENSREG) to develop a common understanding and, if appropriate, suggest a common approach to establishing long-term stewardship programmes”.*
- **See:** [Commission Staff Working Paper](#), Situation concerning uranium mine and mill tailings in the European Union, Brussels, 11.03.2011.
- **And also:** [Directive 2006/21/EC](#) of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC.

CIVIL SOCIETY AND INTERGENERATIONAL STEWARDSHIP CULTURE

- **The role of civil society in RWM has long been recognised in international, European and national law.**
- **A VITAL QUESTION:** *How should CS be defined in this context?*
- **A European framework already exists** relevant to rolling stewardship, mainly the [Aarhus Convention](#) and the [Radioactive Waste Directive's](#) (2011/70/Euratom) Article 10 on transparency.
- **A description of best practices for ICS and T&PP** can be found [NTW's BEPPER report](#) from 2015. It sets four pillars for effective transparency:
 - (i) effective access to information and communication, (ii) effective access to public participation and consultation, (iii) effective access to justice and decision-making, and (iv) effective access to resources.
- Establishes a **level system for evaluation of efficient transparency.**

PROS AND CONS OF INTERGENERATIONAL STEWARDSHIP CULTURE

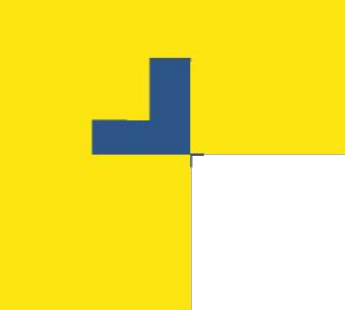
- **ARGUMENTS SUPPORTING INTERGENERATIONAL STEWARDSHIP CULTURE, INCLUDING LTS AND ROLLING STEWARDSHIP:**
- **THE MAIN ARGUMENT:** A **strong emphasis on safety** under all conditions as the primary goal of RWM and final disposal of RW, which should not be diminished, offset or compromised.
- Hence, LTS and rolling stewardship are the best manifestations of **the precautionary principle**.
- As an intergenerational management concept dealing with uncertainty, rolling stewardship sets out to define an **“intergenerational common good”** in order to address the uncertainties triggered by the extremely long time-horizons of the issues that it deals with.
- It represents a strong manifestation of both **the responsibility principle** and **intergenerational justice**.

PROS AND CONS OF INTERGENERATIONAL STEWARDSHIP CULTURE

- **ARGUMENTS AGAINST IN PARTICULAR ROLLING STEWARDSHIP:**
- **THE MAIN ARGUMENT:** Its **perceived lack of practicality**, because it is doubtful whether it can be sustained for tens or hundreds of thousands of years.
- Due to its high economic costs, it could also be argued that it puts undue and disproportional burdens on future generations, thus **violating the polluter pays principle**.
- Rolling stewardship also raises some fundamental questions regarding the long-standing discussion on **whether obligations to future generations exist** and if so, how far they go, whether a comparative, egalitarian or absolute standard should be applied, and how risks and uncertainties should be dealt with.

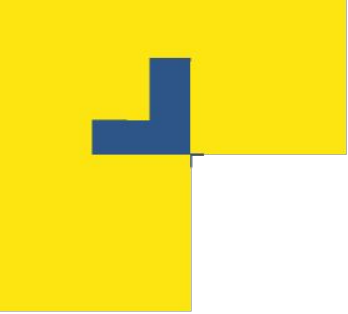
PROS AND CONS OF INTERGENERATIONAL STEWARDSHIP CULTURE

- **DISCUSSION OF THE ARGUMENTS FOR AND AGAINST INTERGENERATIONAL STEWARDSHIP CULTURE:**
- **Objections to rolling stewardship can be refuted with reference to the principle of responsibility in combination with recourse to the precautionary principle.**
- The arguments of **impracticability** and **undue burdens put on future generations** seem **valid**.
- However, whether its high economic costs are proportional to the safety level that it achieves, will depend **on the dependability the passive defence mechanisms of a DGR** and also on the potential economic and environmental costs, if they fail. Under all circumstances, **strong versions of rolling stewardship are generally not compatible with the polluter pays principle.**
- Any position on the **viability of rolling stewardship** will depend on a **preference for weak or strong sustainability.**



REFLECTIONS ON A POSSIBLE WAY FORWARD

1. Establish that intergenerational stewardship culture is **not a controversial or “alternative” notion**.
2. Show that it is a **dynamic concept** that could manifest itself in **different versions** (not a “one size fits all”).
3. **Discuss openly** its pros and cons.
4. Demonstrate its **close affinity with LTS**, which has already been implemented in particular U.S. national and European law.
5. **Promote research on not only rolling stewardship, but also on LTS**, which appears already to have the interest of the European Commission, and by promoting research on LTS try to increase the interest for rolling stewardship.
6. Try to **integrate relevant research in the EURAD-2 project**.



THANK YOU

For further information, please contact:

Niels Henrik Hooge: [nielshenrik\(at\)noah.dk](mailto:nielshenrik(at)noah.dk)

See also the website of NOAH Friends of the Earth Denmark's

Uranium Group: www.noah.dk/urangruppe