

Norwegian Experiences after the Chernobyl Fallout and Perspectives for the EGRM* Guidance

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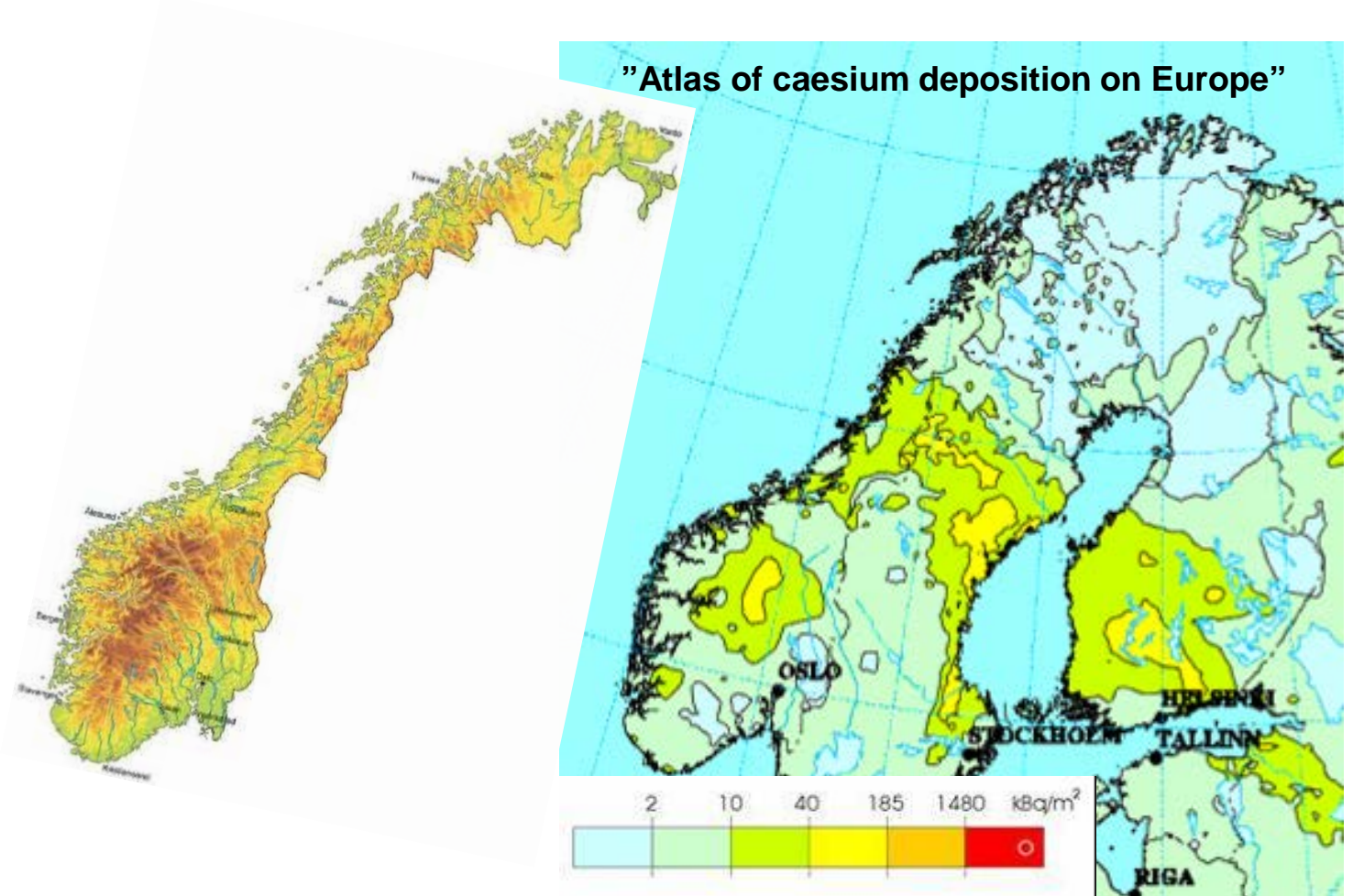


Direktoratet for
strålevern og atomsikkerhet

Norwegian Radiation
and Nuclear Safety Authority

Introduction: Chernobyl fallout in Norway

- Not high enough to be external dose issue
- Early spring, before spring farm work and grazing – not a large issue in cultivated agricultural areas
- Mountainous country - 3 % cultivated areas (vs. 57 % in EU; ~13 % in Japan?)
- Highest Chernobyl deposition: Rural, mountainous areas



The challenge: Use of unimproved forest and mountain pastures



Decisions summer 1986

Permissible levels in foods:

- Established to ensure compliance with dose criteria and to maintain customers' confidence in the foods produced and distributed in the market
- June 1986: 370 Bq/kg ($^{134}\text{Cs} + ^{137}\text{Cs}$) in milk and baby-food, 600 Bq/kg for all other foodstuffs (in accordance with the EC)

Following sampling of grazing animals:

- 31 July 1986: Governmental resolution about compensation to farmers and other producers for economic losses due to the mitigating actions
- Trade ban on reindeer and sheep

Dramatic consequences for reindeer herding

Autumn 1986:

- Levels in reindeer meat approached 100 times the permissible level
- Still ongoing monitoring of NWT fallout suggested effective half-times in reindeer of ~7 years
- Reindeer herding might be affected for generations



Nov. 1986: Increase permissible level for reindeer meat to 6000 Bq/kg (Codex: 1000 Bq/kg)

- Press release by Directorate of Health and Ministry of Agriculture: “A maintained intervention level of 600 Bq/kg will [...] result in production for condemnation and uneasiness among reindeer herders in the coming years. A despondent atmosphere, apathy and defection of young people will come forward in reindeer husbandry and the Sámi community [...]. If the limit is not raised, these problems will last for many years and can thereby threaten the Sámi lifestyle and culture, irrespective of monetary compensation”.
- Accompanied by supporting statement from the Reindeer Herders Union

(Historical lessons on cultural threats and health of indigenous people)


6000 Bq/kg in marketed reindeer meat – not for herders!

- Higher level justified by low consumption of reindeer meat by average citizens (~0.5 kg/yr)
- Required separate actions for herders (100 – 150 kg/yr):

ÅARJELH-SAEMIEN/SØR-SAMISK
**Beapmoeraerie - dutjnien guhte
jijnjem bovtsenbearkoem jih
jaevriengueliem byøpmedh**

• Ij galkh jaepesne jienebem goh 80.000 becquerel njaalmeden dāastodh.
• Voestes jaepien Tjernobyle-ovhøpøen muengnan Nøørjen almetjh tjoeverin gaske-medtie 4.000–18.000 becquerel dāastodh.
• Nøørjen leah garre bijjelahkoe raasth. Eah siejhme āestijh daarpesijh radioaktivite-ten gaavhtan sterkiestidh gosse beapmoch jurjehtieh.
• Daan brāāsijren beapmoeraerieh leah barre dejtie guhtj jijnjem bovtsenbearkoem jih jaevriengueliem byøpmedieh.

Dietary advice: On contamination levels and consumption rates, methods of cooking and preparation to reduce contamination



Whole-body monitoring (dose surveillance and control of personal countermeasure efforts)

- Reindeer meat from less contaminated areas
- Compensation for clean feeding of animals for own consumption
- Compensation for purchase of alternative foodstuffs

Condemnation was unsatisfactory and expensive

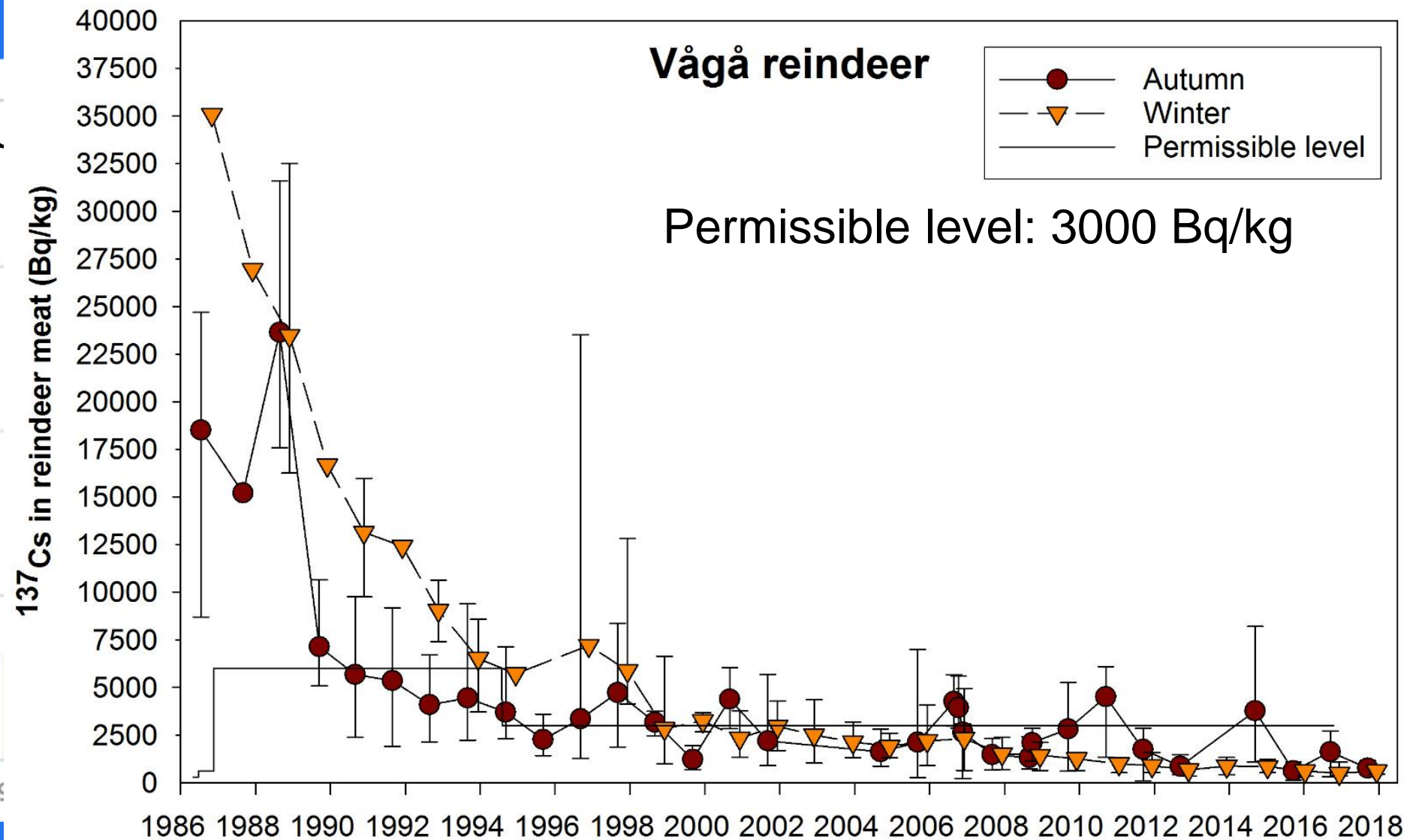
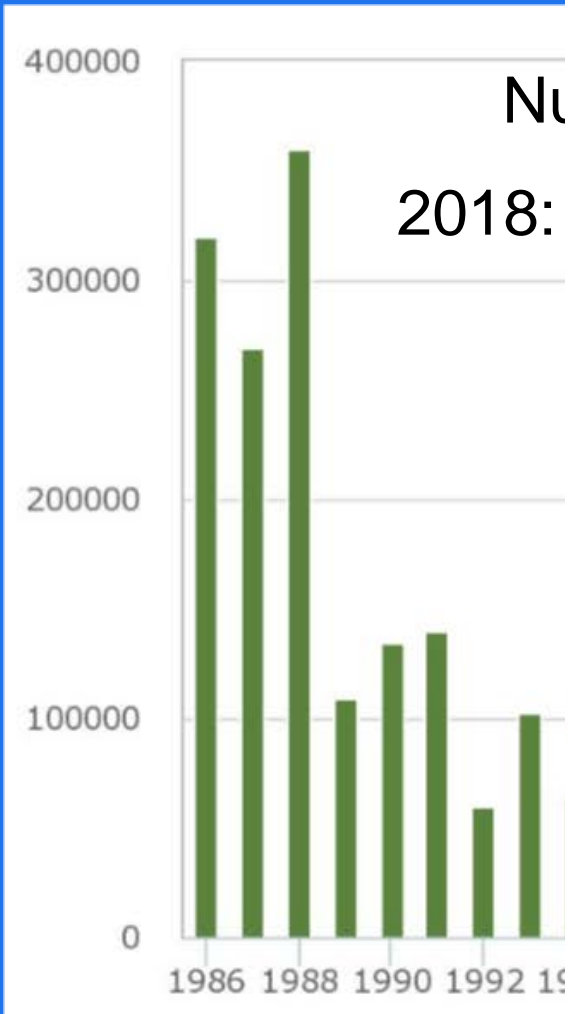
To limit resource use and costs various methods were developed:

- Clean feeding (sheep and reindeer)
- Live monitoring: Rapid; slaughter least contaminated animals; decide clean feeding periods; avoid condemnation
- Criteria for control of sheep: Median of herd sample instead of individual measurements
- Cs binders (Giese salt/AFCF): In concentrates, salt-licks and rumen boli

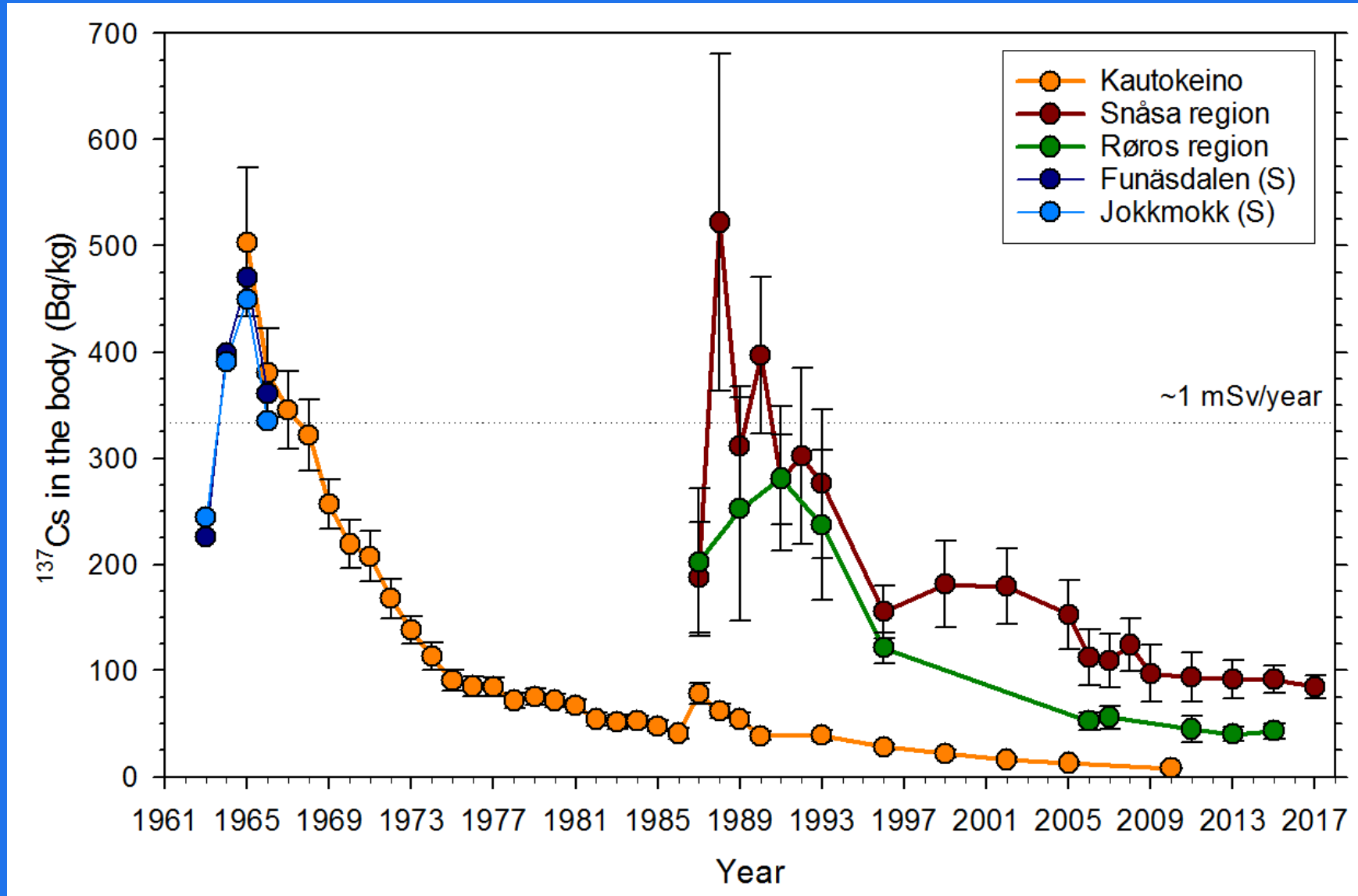
Much involvement of local authorities, farmer's and reindeer herders in R&D, practical implementation etc.



Current situation



Cs-137 in reindeer herders



Feedback from herders and farmers

Important for coping:

- social support (locally and nationally - no discrimination)
- production/business saved (economic guarantees from the government)
- cooperation to solve the challenges (within + with authorities/ scientists)
- voluntariness (e.g., WBM) and co-determination increases feeling of influence and control

Negative: Vague/unclear answers from experts – distrust initially

“Qualities like decency, honesty and trust are very important keywords in such a situation” (local journalist and sheep farmer)

Perspectives for EGRM Guidance (1)

- Consequences in Norway associated with food production in vulnerable environments, but experiences refer to universal human needs and values
- Planning for recovery should include analysis of potentially affected groups (e.g. proximity, occupation, habits)
- Potential recovery strategies should be evaluated – including strategies where the population may play active roles
- Involve stakeholders, identify their priorities and what strategies are most acceptable and preferable
- Build trust (also important motivator for population's actions)

Perspectives for EGRM Guidance (2)

- Expect divergent views – not consensus: *“It is a lot like mercury: wherever you touch it, it divides; when you shift the plane of analysis, diverse groups bead together in unexpected ways”* (Stephens 1994; on social consequences of Chernobyl in Norway)
- Prepare for potentially long-lasting efforts/management



Thank you for your attention

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