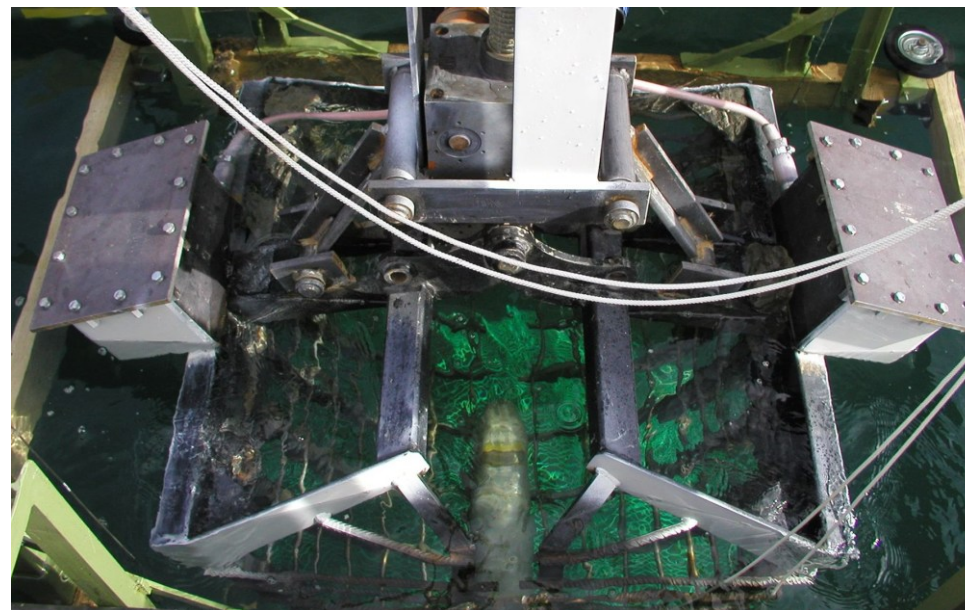




Competition of ideas: “Safe and environmentally friendly methods for recovering munitions from Swiss lakes”



Media briefing, 23.01.2026, Bern

armasuisse W+T

Historical context: immersions

Immersion period: 1918-1964

- Surplus/obsolete ordnance ammunition belonging to the armed forces (e.g. stocks from the Second World War)
- Remnants of accidental explosions in ammunition depots (e.g. Mitholz-Blausee)
- Defective batches from ammunition factories

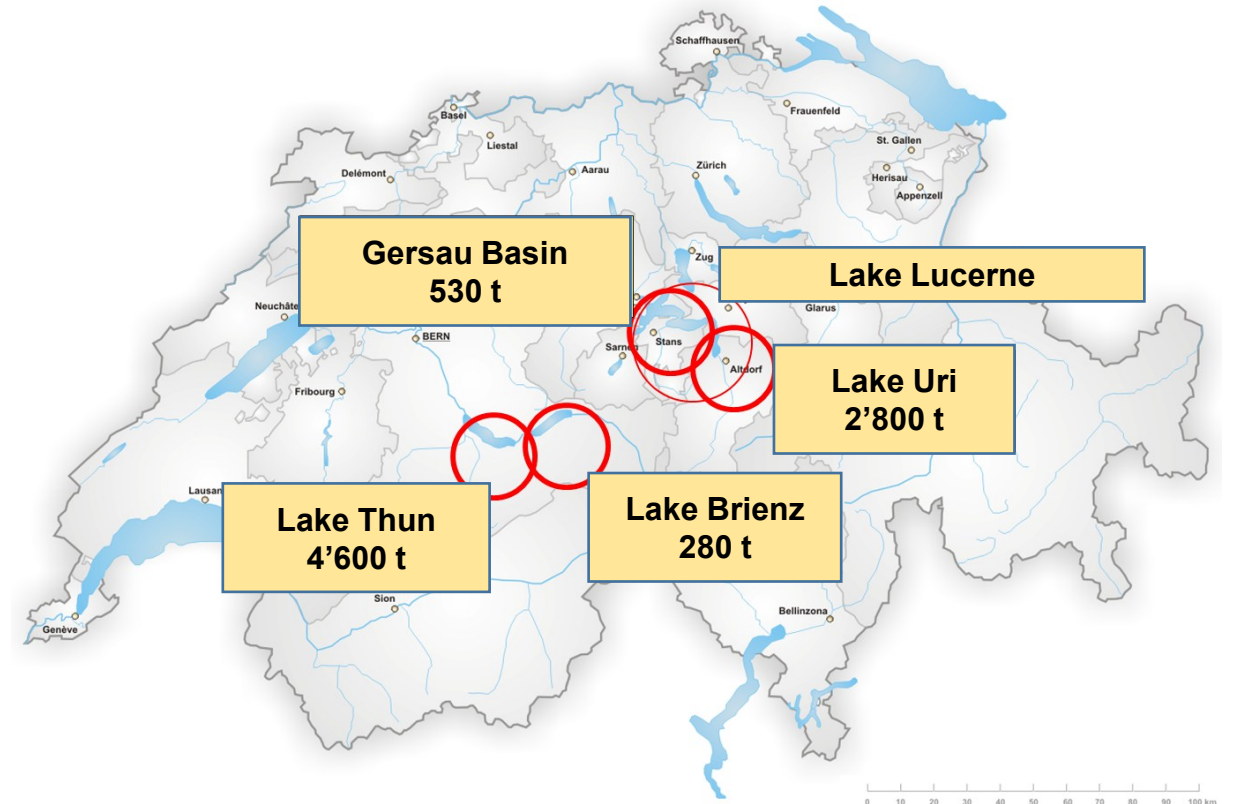


Mostly at a depth of 150-215 m



Main locations

	Immersions
Munition type	Containing explosives
Main location(s)	Lakes Thun, Lucerne and Brienz
Depth	Deep: 150-215 meters
Amount	About 8'200 tons





Investigations (1993-2005)

- **1993–1995:** Initial investigations
- **Summer 2000:** Deformities observed in the gonads of certain fish in Lake Thun

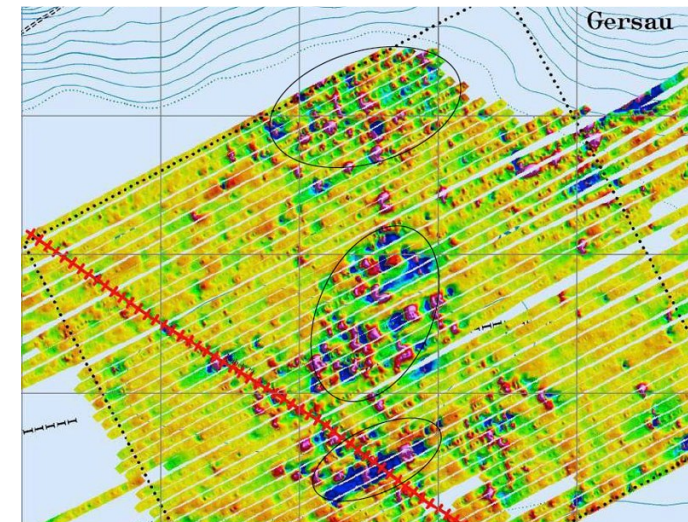


- **2004:** **Historical investigation** commissioned by the GS-VBS
→ > 95% of immersions in Lakes Thun, Brienz and Lucerne
- **2005:** **1st risk assessment**
→ no harmful effects and identification of knowledge gaps

Risk assessment 2012

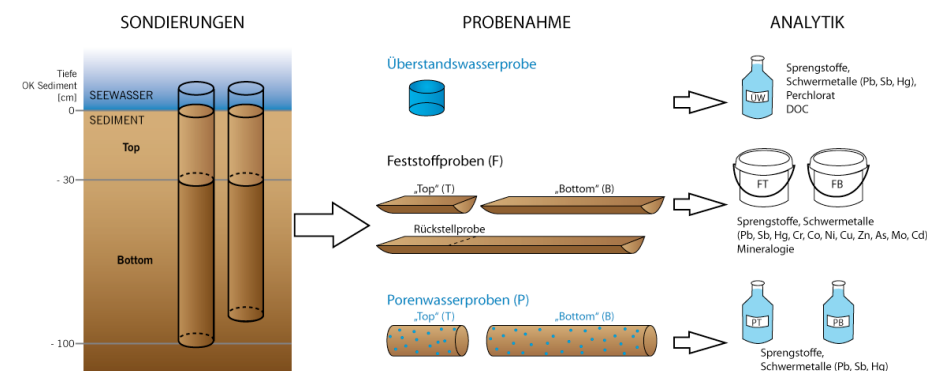
Comprehensive risk assessment

- Location and distribution of munitions
- Recovery of munitions for testing
- Analyses (water, sediments and interstitial water)
- Degradation rate of explosives in sediments
- Modelling
- Risk and environmental risk assessment



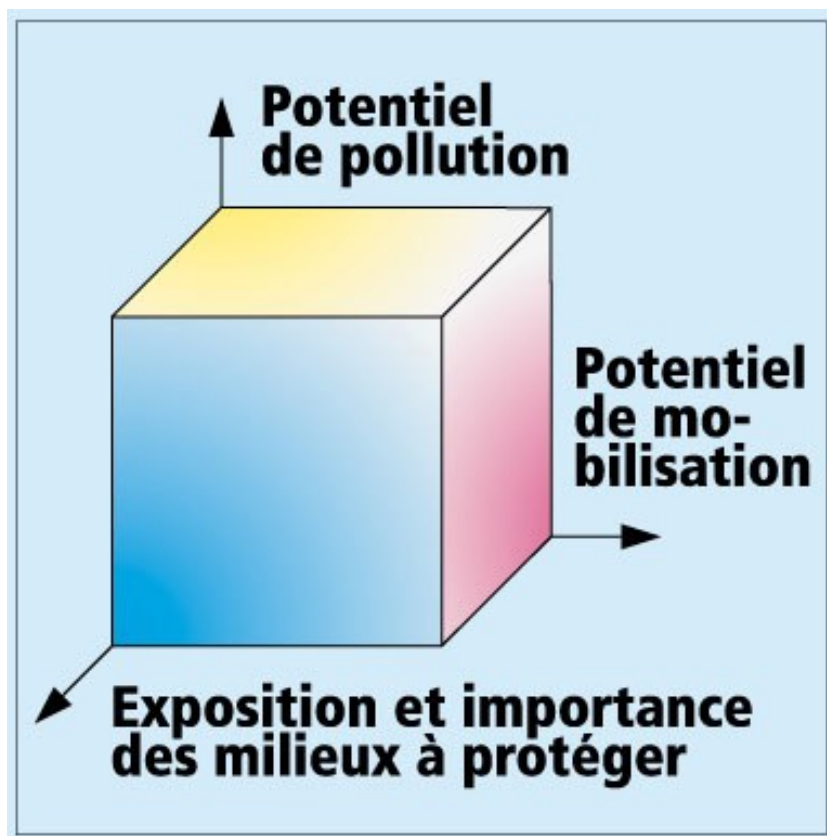
Magnetic anomalies in the Gersau Basin: extended distribution with three hot spots (red line = cable)

Bericht Militärische Munitionsversenkungen in Schweizer Seen. Umfassende Gefährdungsabschätzung, 2012



Sampling and analysis programme

Risk assessment 2012



<https://www.bafu.admin.ch/bafu/fr/home/themes/sites-contamines/les-erreurs-du-passe/potentiel-de-pollution.html>

Pollution potential

How dangerous are the pollutants and in what quantities are they present?

Exposure and importance of the assets to be protected

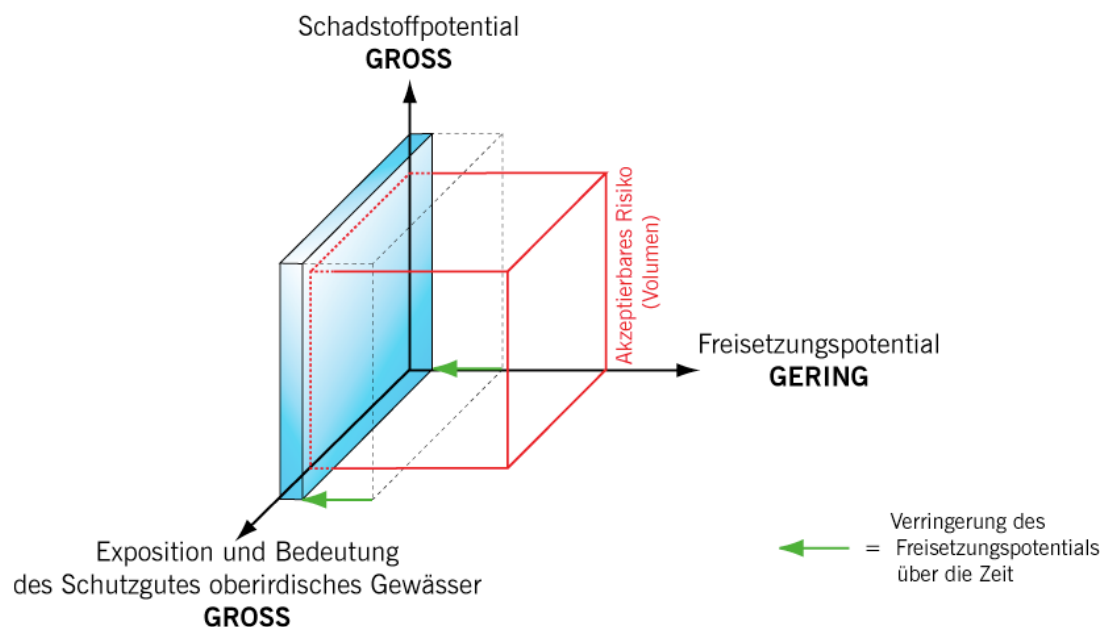
Can the pollutants reach protected resources? How extensive could the damage be?

Dissemination potential

How quickly, how far and in what quantities are the pollutants released and transported?

Bericht Militärische Munitionsversenkungen in Schweizer Seen. Umfassende Gefährdungsabchätzung (2012)

Risk assessment 2012



⇒ Low risk due to very low dissemination potential

Pollution potential

High pollution potential, as significant quantities of ammunition sunk

Exposure and importance of assets to be protected

High importance of the protected resource “lake water”, as used or potential to be used as drinking water

High exposure, as spatial distance between deposited ammunition and protected resource small

In future: exposure decrease due to the ever-increasing sediment cover (approx. 0.5 cm/year)

Dissemination potential

Low potential for substances to be released into the protected resource



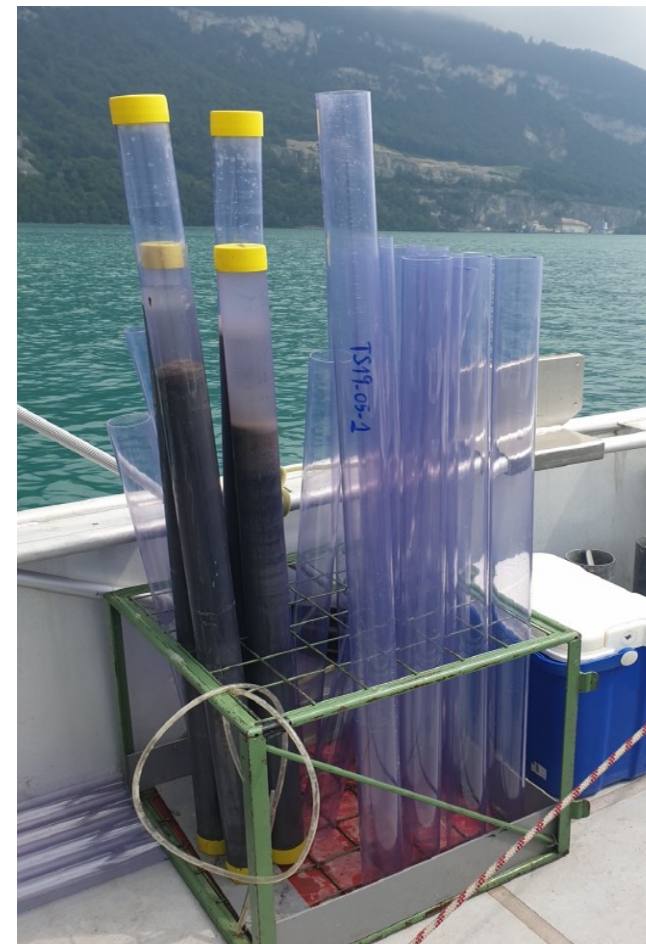
Lake monitoring

- Recommended in the 2012 risk assessment
- Water: every 5 years
- Sediments: every 10 years
 - Heavy metals (Lab. Spiez)
 - Explosives (Bachema & GBL)
 - Perchlorate (Lab. Veritas 2024-2025)



No evidence of release of explosives or degradation products from submerged munitions into the lake water

- Last sampling campaign: 2024-2025





Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

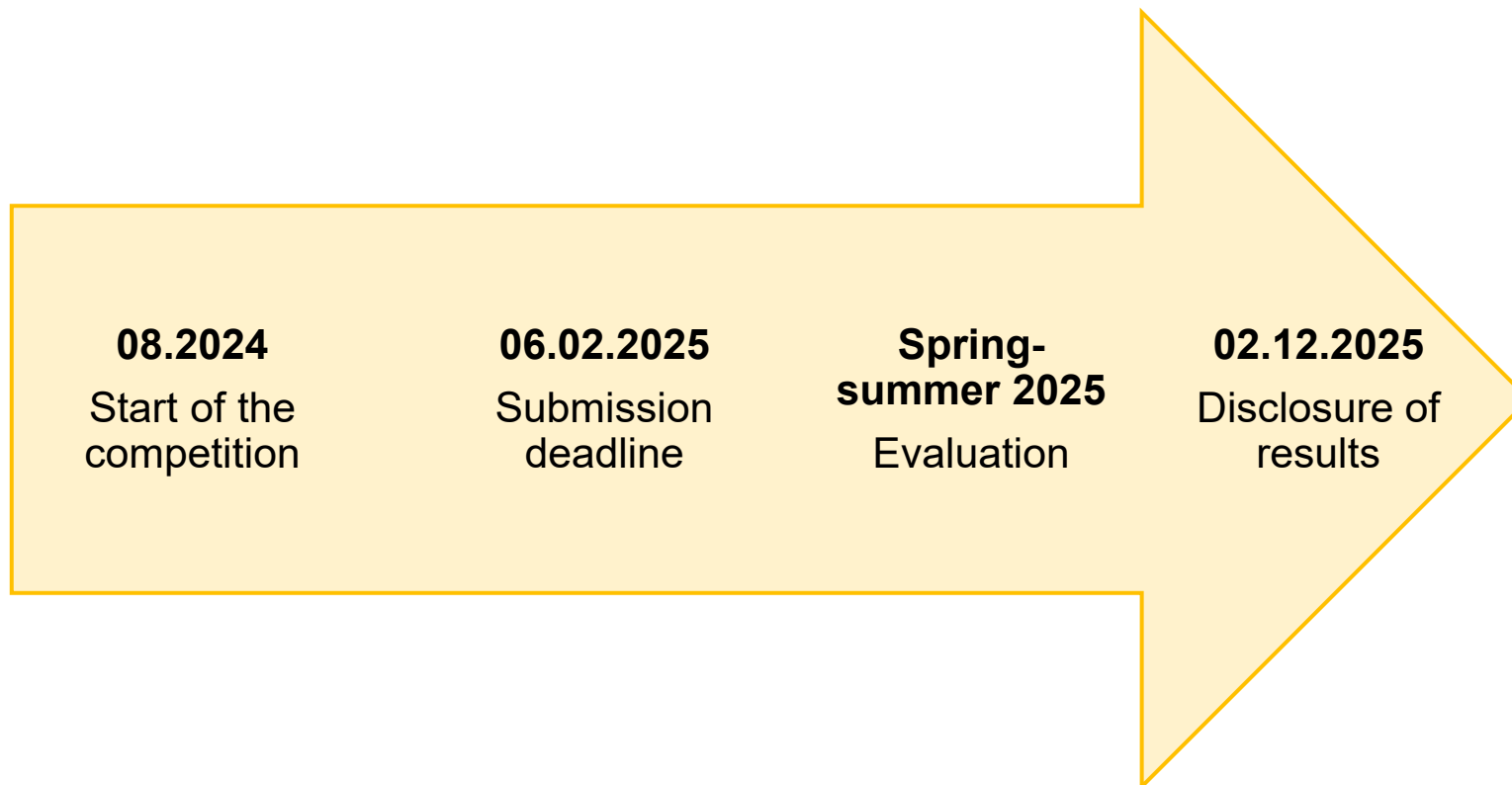
Communication | Published on 7 August 2024

armasuisse launches idea competition for environmentally friendly and safe recovery methods of ammunition from Swiss waters

Bern, 7.8.2024 - The Federal Office for Defence Procurement armasuisse is seeking new procedures for the environmentally friendly and safe recovery of ammunition from Swiss waters by means of an idea competition. The three best competition entries will be awarded prize money of altogether 50,000 Swiss Francs. It is not planned to implement the submitted entries immediately, but they could serve as the basis for further clarifications or for launching research projects.



Timeline





Expected outcomes

Anonymity

- 1 envelope with competition entry (identified by password)
- 1 envelope with information about the author (password)

Compliance with the competition programme

- Description of the method in written and digital form with a maximum of 15 pages of text (excluding diagrams)
- § 2.2 Tasks and objectives of the competition programme

Les points suivants doivent être pris en considération dans l'idée soumise :

- Description détaillée de la méthode de repêchage, y compris la plate-forme de travail à la surface et les mesures visant à réduire la dispersion de la vase lors du repêchage du fond jusqu'à la surface
- Exigences en matière de qualité de la détection/localisation des munitions avant le repêchage (résolution locale et précision de la mesure)
- Estimation de la libération de vase lors du repêchage au fond et lors du transport vers la surface
- Estimation de la part résiduelle de vase dans les munitions repêchées (à la surface)
- Estimation de la quantité de vase à éliminer par m³ de volume évacué
- Estimation des dépenses énergétiques par m³ de volume évacué
- Contrainte mécanique sur les munitions lors du repêchage au fond et du transport jusqu'à la surface. Description des forces principales qui agissent sur les munitions, avec estimation de leur intensité
- Indication du débit horaire en m³/h lors de l'évacuation d'une unité de repêchage comprenant un objet de grandes dimensions (diamètre 10 à 20 cm) et 20 petits objets (diamètre 0,5 à 10 cm) par m² recouverts d'une couche de sédiments de 200 cm
- Évaluation de la qualité de l'évacuation (en pour cent) pour les deux classes : les objets d'un diamètre > 2 cm et les objets d'un diamètre de 0,5 à 2 cm (100% correspondent à une évacuation intégrale de tous les objets par classe dans la surface traitée)
- Il convient également de donner des informations concernant le système qualité (par ex. instruments permettant la surveillance de la dispersion des sédiments et la vérification de la qualité d'évacuation), s'il y en a déjà un
- Indication du degré de maturité technique actuel de la solution proposée ou des composants



Evaluation criteria

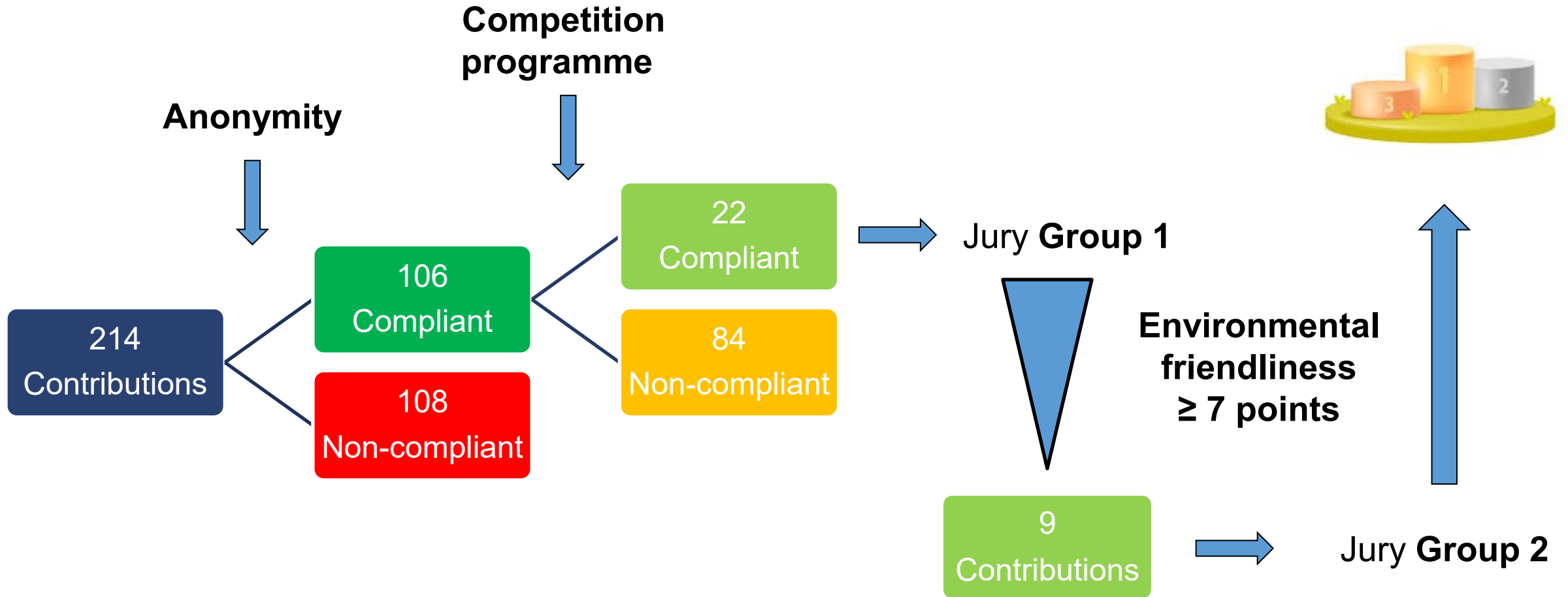
Points: min 1 - max 10

Criteria	Sub-criteria	Weighting
Technical feasibility	<ul style="list-style-type: none">• High technology readiness level• Low technical implementation effort• Possibly experience with similar problems	1.5
Environmental friendliness	<ul style="list-style-type: none">• Low silt dispersion during recovery and transport to the surface• Low remaining environmental impacts and environmental risks• High energy efficiency	1.5
Clearing capacity and amount of sludge for disposal	<ul style="list-style-type: none">• High clearance volume per time• Low amounts of sludge from recovered ammunition and per volume cleared	1
Clearing quality	<ul style="list-style-type: none">• Little ammunition remaining after clearance• High clearance quality even for small ammunition objects with a diameter of 0.5 to 2 cm• High clearance quality even for non-magnetic ammunition objects	1
Safety aspects	<ul style="list-style-type: none">• Low mechanical forces acting on the ammunition during operation	1

Environmental friendliness < 7 points → exclusion



Evaluation process





Outcomes

	Authors	Montant (TVA 8.1% comprise)
1 st prize	Project " BEAVER " IHC Defence, Kinderdijk (NL) & REASeuro, Riel (NL)	32'430.00 CHF
2 nd prize	Project " Blauwal " Helbling Technik Wil AG (CH)	16'215.00 CHF
3 rd prize	Project " cochlea " Walo Bertschinger AG (CH)	5'405.00 CHF



Conclusions

Context

- Competition of ideas to recover munition in Swiss lakes at 150-215 meters depth
- Munition covered by sediment layer up to 2 meters (growing over time)
- No evidence of release of explosives or degradation products from submerged munitions into the lake water

Outcomes

- Approaches and elements of interest to study and examine in greater detail
- Technical developments required to obtain “proof of concept” and validation
- Open questions such as management of recovered ammunition (transport and disposal)



Several years of development needed before a proven method for environment-friendly and safe munitions recovery is available



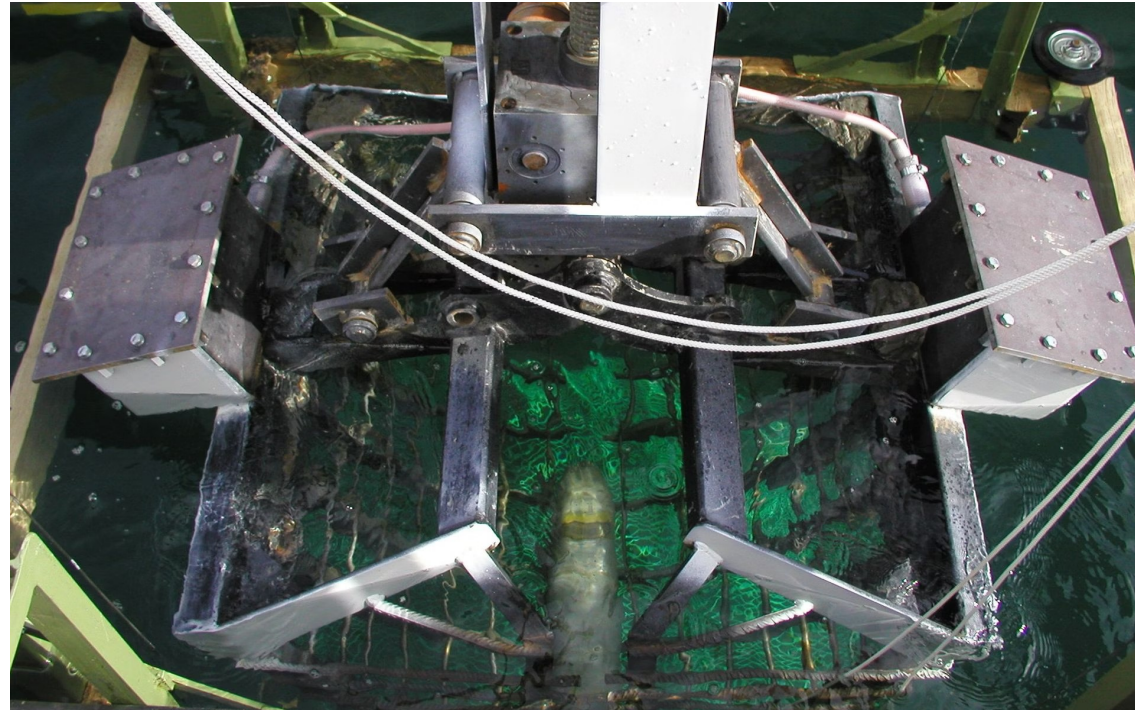
And now?

Working groups

- Ecology
 - Safety
-
- Complete and expand upon competition of ideas
 - Answer questions not considered in competition → f.ex. munition transport/disposal
 - Identify gaps in knowledge → possibly launch research projects



Questions?





Links

- [Munitions dans les lacs suisses – Informations du DDPS](#)
- [Munition in Schweizer Seen – Informationen des VBS](#)

- [Concours d'idées](#)
- [Ideenwettbewerb](#)

