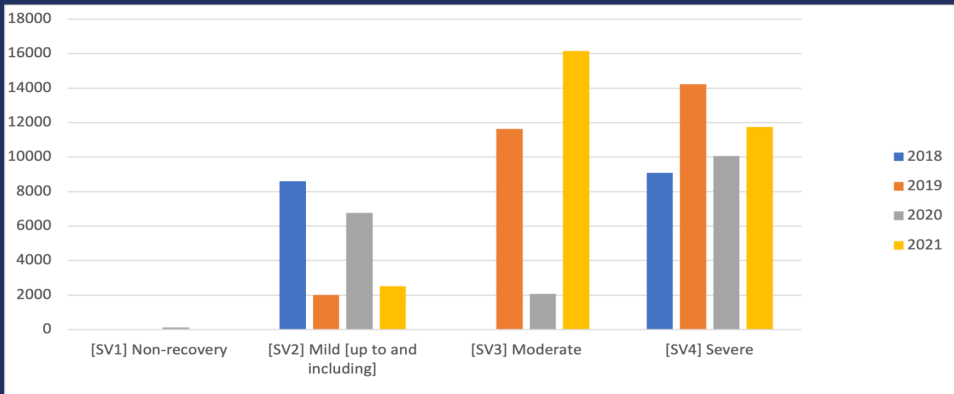
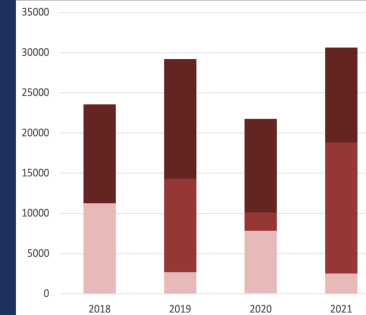
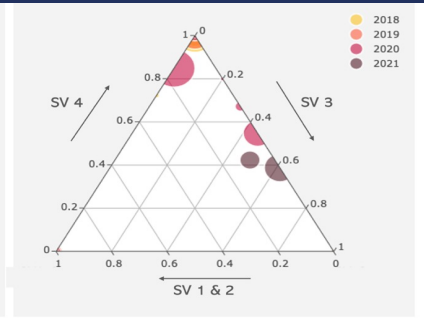
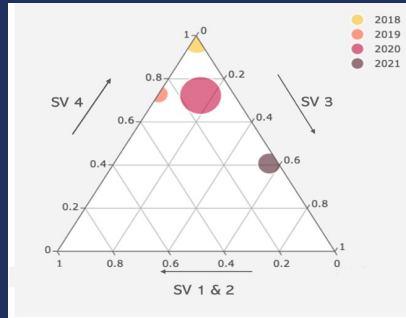


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Research animal use in Norway from 2018 to 2021: *A preliminary report with emphasis on severity and purpose*

Antoine Champetier & Adrian Smith

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Research animal use in Norway from 2018 to 2021:

A preliminary report with emphasis on severity and purpose

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Table of Contents

Summary in Norwegian.....	3
Summary.....	4
Introduction.....	5
Terminology	6
Norwegian statistics compared to the EU.....	7
Severity of uses	8
a. All species	8
b. Salmon, zebra fish and other fish	9
c. Mice	11
Number of procedures.....	12
Purposes	14
a. All species	14
b. Fish.....	14
Graphical representation of animal use organised by purposes	16
Genetic status	17
a. All species	17
b. Mice	18
c. Zebra fish	18
Re-use of animals	19
Influence of individual projects	21
a. Ternary plots for all species.....	21
b. Atlantic salmon.....	22
c. Rainbow trout	23
d. Mice	23
Concluding remarks.....	24
Acknowledgements.....	24
Appendix.....	25

Summary in Norwegian

Denne rapporten inneholder en analyse av bruken av forsøksdyr i Norge i årene 2018, 2019, 2020 og 2021, basert på offisielle data fra Mattilsynet¹. Selv om den norske forvaltningen har publisert statistikk over bruken av forsøksdyr i mange år², er disse de første årene med detaljerte opplysninger som kan sammenlignes med rapportene fra EU-kommisjonen.

Databearbeidelsen ble foretatt av Antoine Champetier ved Swiss 3R Competence Centre (3RCC)³, og arbeidet ble finansiert av Dyrevernalliansens forskningsfond⁴.

De første funnene er:

- Det er ingenting som tyder på at det store antallet dyr som Norge bruker til forskning er i ferd med å avta.
- Belastningsgraden på forsøksdyrene er økende. Antallet bruksområder i kategorien 'mild' minker stadig. Antallet bruksområder i de to mer belastende kategoriene ('moderat' og 'betydelig') viser ingen tegn til nedgang. Moderat belastende forsøk var den dominerende gruppen i 2021.
- Enkeltforsøk med store antall fisk fortsetter å være hovedfaktoren som påvirker den nasjonale statistikken.
- Batchtesting og annet regulatorisk og kvalitetsikringsarbeid er blant forsøkene som gir størst belastning på fisk. Det er ingen tegn på at antallet dyr som brukes til dette formålet synker.
- Det er svært begrenset gjenbruk av forsøksdyr i Norge.

Arbeidet med å analysere bruken av dyr i forskning i Norge bør fortsette, for å skaffe mer innsikt i mulighetene for å anvende de tre R'ene (Replacement, Reduction, Refinement) i enda større grad.

¹ https://www.mattilsynet.no/dyr_og_dyrehold/dyrevelferd/forsoksdyr

² <https://norecopa.no/no/lovverket/statistikk>

³ <https://swiss3rcc.org>

⁴ <https://dyrevern.no/dyrevern/sok-midler-fra-dyrevernalliansens-forskningsfond>

Summary

This report provides an analysis of the patterns of animal use in Norway for the years 2018, 2019, 2020 and 2021, using official data from the Norwegian Food Safety Authority (Mattilsynet)¹. Although the Norwegian authorities have published annual reports on research animal use for many years², these are the first years with detailed, data corresponding to the reports issued by the EU Commission.

Integration and analysis of the data was performed by Antoine Champetier, Swiss 3R Competence Centre (3RCC)³ and was financed by a grant from the Norwegian Animal Protection Alliance's Research Fund (*Dyrevernalliansens forskningsfond*)⁴.

The initial findings are:

- There are no signs that the large number of animals used in Norway for research is starting to diminish.
- The actual severity of animal uses in procedures is increasing. The number of uses resulting in mild severity is steadily decreasing. The number of uses resulting in moderate and severe levels of severity show no sign of diminishing. Moderately severe uses were dominant in 2021.
- Single large projects on fish continue to be the main factor affecting the national statistics.
- Batch testing and other regulatory and quality control procedures are among the uses where severity is the highest for fish. There is no indication that the number of animals used for these purposes is diminishing.
- There is very limited re-use of research animals in Norway.

The work of analysing the use of animals in Norway for scientific purposes should continue, to gain more insight into possibilities for further implementation of the Three Rs (Replacement, Reduction, Refinement).

Introduction

Previously published information about the use of animals for research purposes in Norway is relatively sparse. Norecopa has collected the annual reports from the Norwegian Animal Research Authority (*Forsøksdyrutvalget*) which had responsibility for this until 1 July 2015, and links to available information from the Norwegian Food Safety Authority (*Mattilsynet*) which took over the regulatory function from that date⁵.

Currently, annual reports from the Food Safety Authority consist of a table, some graphics and approximately one page of text. The three figures in the Authority's report for the year 2021 are depicted below (Figure 1):

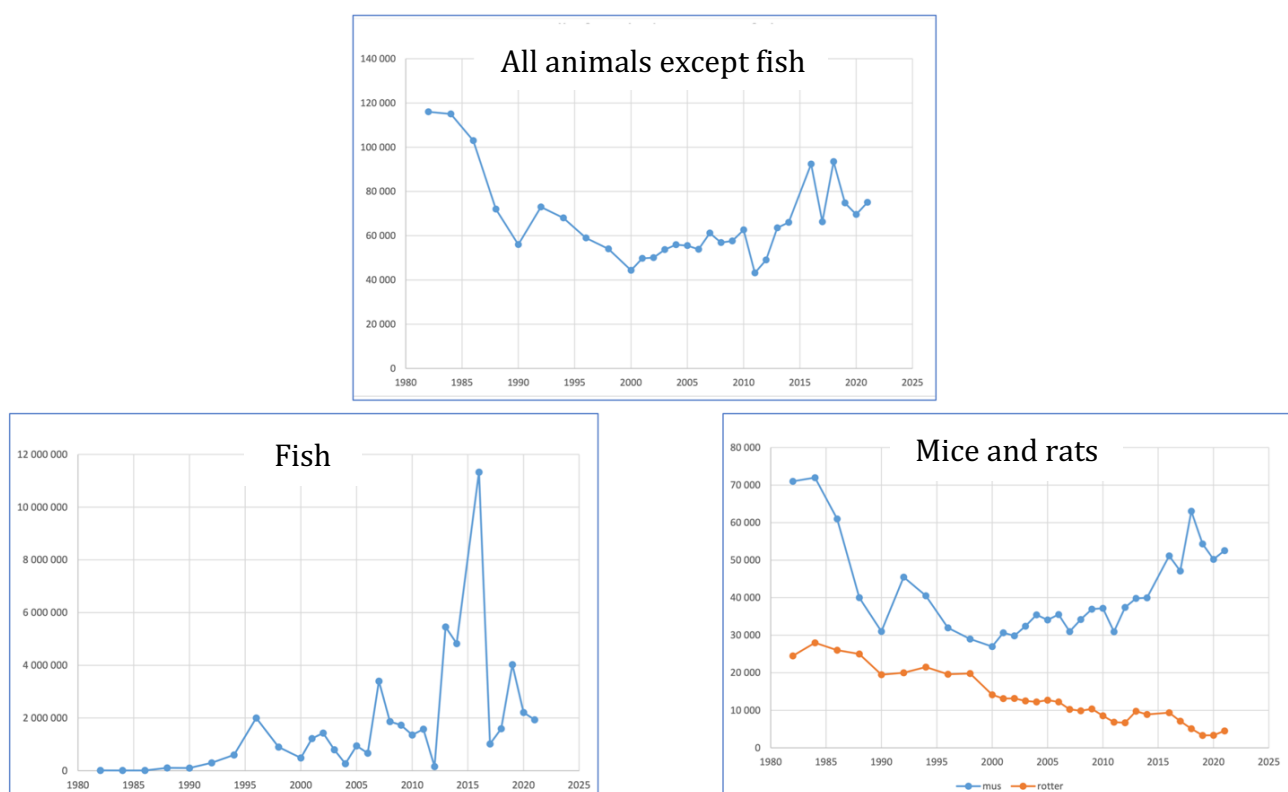


Figure 1: Trends in the use of research animals in Norway (figures from the Norwegian Food Safety Authority's report for 2021)⁶.

The number of fish used in 2019 was later reduced from 4 million to 1.2 million.

⁵ <https://norecopa.no/legislation/statistics>

⁶

https://www.mattilsynet.no/dyr_og_dyrehold/dyrevelferd/forsoksdyr/bruk_av_dyr_i_forsok_i_2021.47085/binary/Bruk%20av%20dyr%20i%20forsok%20i%202021

After a steady decline in research animal numbers during the 1980s (before fish farming became a major industry in Norway), their use has increased - both for the traditional laboratory animal species and for fish. The large fluctuations in fish numbers reflect the challenges faced by the fish farming industry - in particular the need for fish vaccines, medicinal treatment, new technologies and more knowledge about fish welfare. In 2016 over 11.6 million animals were used in Norway for scientific purposes: over 10.6 million of these were used in just two field projects, on methods to combat salmon lice⁷.

The total number of animals (aquatic and terrestrial) used in the years 2018-2021 ranged from 1.28 million to 2.01 million (see Table 1, page 8). While 2021 was the year with the largest number of animals, there are no clear trends over these four years, and no evidence of a decline in animal use. Single projects, particularly those on Atlantic salmon, continue to have the most effect on total numbers and may mask any trends. The effects of other factors, such as a possible decline in animal use in 2020 due to the COVID-19 pandemic, are also currently unknown.

Terminology

In this report, we have tried as far as possible to use terminology that is defined in the EU Directive 2010/63/EU⁸.

Article 3 of the Directive defines **Project** as ‘a programme of work having a defined scientific objective and involving one or more **procedures**’.

The same Article defines a **Procedure** as ‘any **use**, invasive or non-invasive, of an animal for experimental or other scientific **purposes**, with known or unknown outcome, or educational **purposes**, which may cause the animal a level of pain, suffering, distress or lasting harm equivalent to, or higher than, that caused by the introduction of a needle in accordance with good veterinary practice’. In this report, we use **procedure** and **use** interchangeably.

In addition, the **actual severity** experienced by animals in procedures is reported, using four categories defined in Article 15 and Annex VIII (see Table 1 in this report). The severity which animals experience within one and the same procedure can vary from animal to animal, and is therefore reported separately.

Many projects comprise multiple species, multiple purposes and multiple categories of severity. Each of these are given separate entries in the statistics sent to the EU Commission.

⁷

https://www.mattilsynet.no/dyr_og_dyrehold/dyrevelferd/forsoksdyr/bruk_av_dyr_i_forsok_2016.28918/binary/Bruk%20av%20dyr%20i%20forsok%202016

⁸ <https://norecopa.no/legislation/eu-directive-201063>

Norwegian statistics compared to the EU

The use of animals for research, testing and education is regulated by EU Directive 2010/63/EU⁸, which Norway has implemented. The ultimate goal of the Directive is total replacement of animal use by alternative methods. The work toward this goal is embodied in the concept of "The Three Rs" (*Replacement, Reduction, Refinement*), formulated by Russell and Burch⁹. Until total replacement can be achieved, efforts must be made to reduce both the number of animals and the severity of uses to an absolute minimum.

Norway currently uses approximately one fifth of the total number of animals used in the EU (Figure 2). Norwegian data have been included in the EU statistics since the report for 2018. Reports from the EU Commission¹⁰ are currently available up until the year 2019.

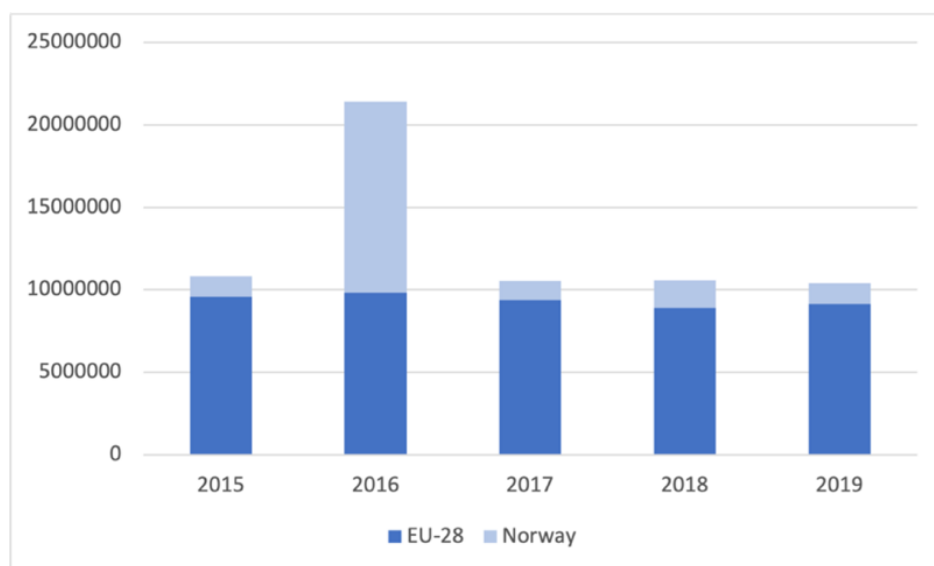


Figure 2: Total number of animals used in Norway and the EU from 2015 to 2019
The y axis is the total number of animals used each year.

⁹ <https://norecopa.no/alternatives/the-three-rs>

¹⁰ https://ec.europa.eu/environment/chemicals/lab_animals/index_en.htm

Severity of uses

Directive 2010/63/EU on the protection of animals used for scientific purposes¹¹, which Norway has implemented, defines four categories of severity (see Appendix A1 for more details):

SV1: Non-recovery (*terminale forsøk*)

SV2: (up to and including) Mild (*t.o.m. lett belastende forsøk*)

SV3: Moderate (*moderat belastende forsøk*)

SV4: Severe (*betydelig belastende forsøk*)

All procedures in a project application have to be prospectively assigned with a severity category based on the highest severity likely to be experienced by an animal in that procedure, after taking into account all elements that may increase or reduce the severity, in line with Annex VIII of the Directive.

In contrast, the severities reported in the statistics are based on actual experienced severities as recorded during monitoring of the individual animals during the procedure.

The following tables and figures present Norwegian data for 2018-2021.

a. All species

Over all four years on average, category SV2 (up to and including Mild) dominated the statistics (Table 1), and incorporated 3.5 million uses of animals, out of a total of nearly 6.4 million uses (55%). However, category SV3 (Moderate) was the dominant category in 2021, with 1.083 million uses out of a total of 2.008 million uses (54%).

Table 1: Number of animals used by severity of uses per year (all species)

Severity	2018	2019	2020	2021	Total
[SV1] Non-recovery	79 855	38 232	8 992	5 142	132 221
[SV2] Mild [up to and including]	962 928	873 629	849 358	814 514	3 500 429
[SV3] Moderate	562 178	274 838	486 963	1 083 420	2 407 399
[SV4] Severe	81 688	94 896	76 728	105 549	358 861
Total	1 686 649	1 281 595	1 422 041	2 008 625	6 398 910

In 2021, over 800,000 more uses resulted in moderate severity (SV3) compared to 2019.

There is no clear trend in the uses in the most severe category (SV4), which on average

¹¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02010L0063-20190626&from=EN>

represents 5.8% of all uses over the four years, ranging from 4.8% in 2018 to 7.4% in 2019.

The uses in the least severe category (non-recovery, SV1) and the mild category (SV2) both show relative decreases from year to year (Figure 3).

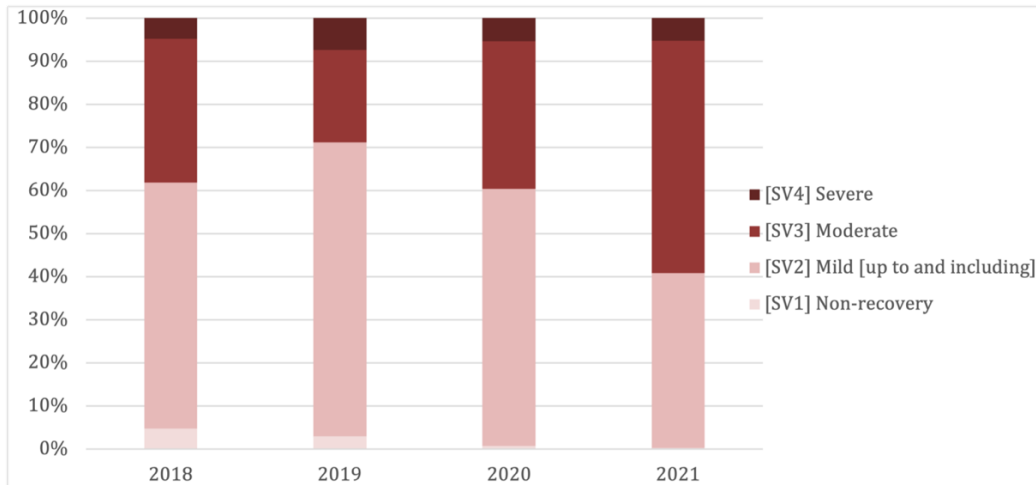


Figure 3: Percentage of uses by severity category by year (all species)

b. Salmon, zebra fish and other fish

Atlantic salmon is such a dominant species in terms of numbers of uses that most statistics which combine them with other species mainly reflect the patterns in salmon use and hide the patterns of other species. Likewise, zebra fish comprise the majority of laboratory fish, which are used as models for human conditions.

The reporting requirements have now been amended with the adoption of Commission Implementing Decision 2020/569/EU¹² to reduce 'other' categories to improve the usability of the reports. One of these 'other' categories is 'other fish'. From 2021 data onwards, Member States and Norway are required to report separately the following:

- zebra fish
- sea bass
- salmon, trout, chars and graylings
- guppy, swordtail, molly and platy
- other fish

¹² https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2020.129.01.0016.01.ENG&toc=OJ:L:2020:129:TOC

Figure 4 shows the numbers of Atlantic salmon and Figure 5 shows the numbers of zebra fish, while Figure 6 shows all other fish.

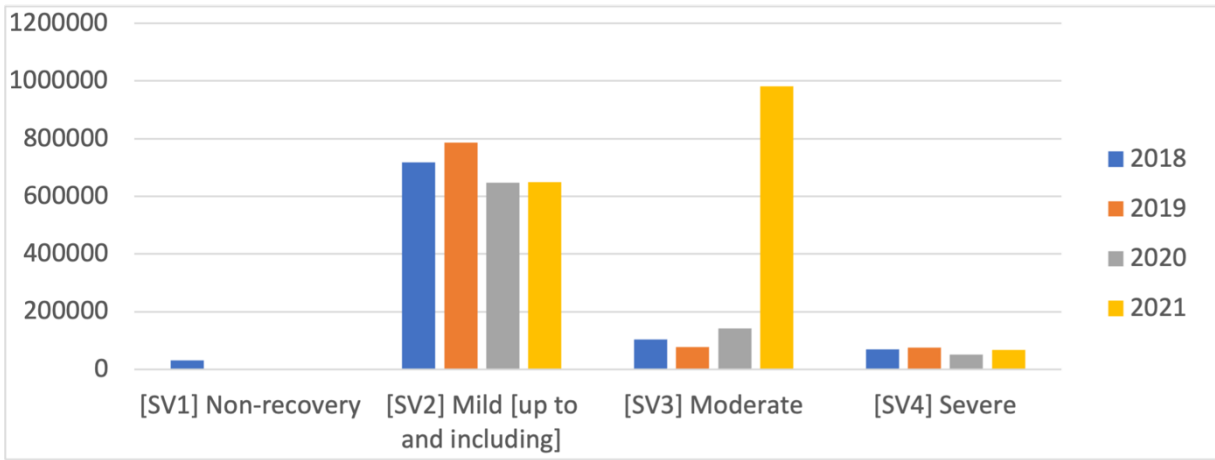


Figure 4: Number of Atlantic salmon used by severity category by year

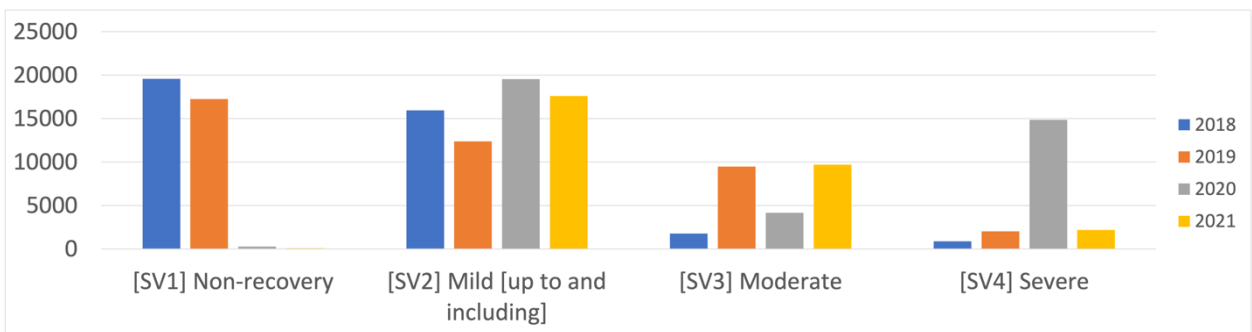


Figure 5: Number of zebra fish used by severity category by year

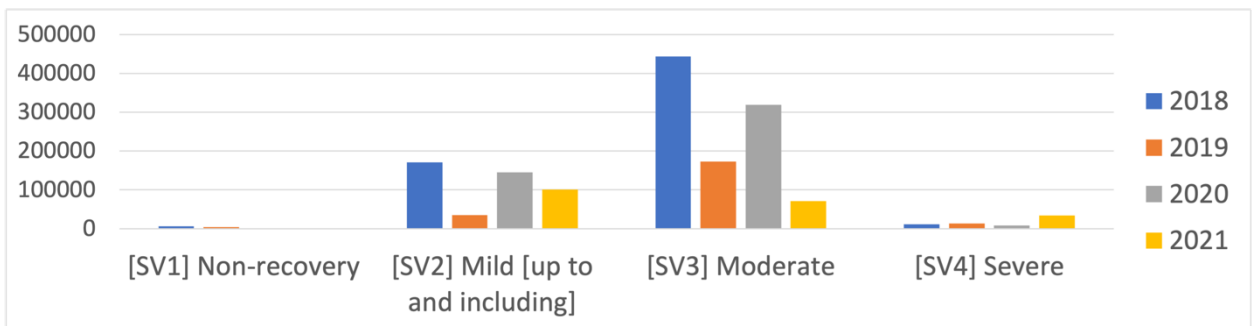


Figure 6: Number of animals used by severity category by year for fish, excluding salmon and zebra fish

c. Mice

The international efforts to refine scientific procedures on animals have often focused on mice and other rodents, since these tend to be the species that are most often used. The official Norwegian figures give no indication of any general trend towards such refinement: the number of non-recovery procedures has decreased, and the number of uses for moderately severe procedures shows no sign of reduction:

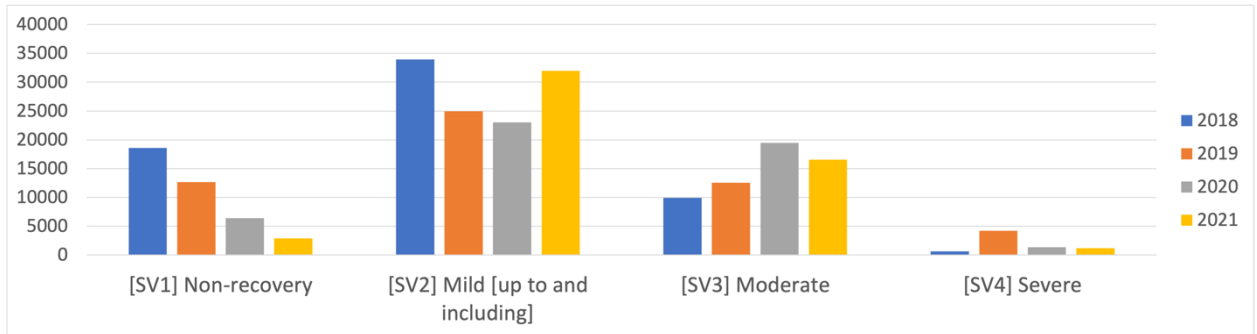


Figure 7: Number of mice used by severity category by year

Number of procedures

In order to better understand total animal use in Norway, the following three tables were constructed. They illustrate the number of uses during the four years, and the actual severities these uses resulted in, for three groups of animals: zebra fish, all other fish, and all other species:

Table 2: Number of projects using zebra fish

	2018	2019	2020	2021
Total number of unique projects	31	30	32	25
Number of projects represented within each severity category				
[SV1] Non-recovery	9	7	3	1
[SV2] Mild [up to and including]	19	21	21	18
[SV3] Moderate	6	10	11	8
[SV4] Severe	1	5	4	4

The number of projects using zebra fish is relatively constant. These animals constitute, however, a small fraction of the total number of animals used in Norway (see Figures 5 and 12, pages 10 and 18).

Table 3: Number of projects using all fish other than zebra fish

	2018	2019	2020	2021
Total number of unique projects	346	314	301	341
Number of projects represented within each severity category				
[SV1] Non-recovery	45	33	25	16
[SV2] Mild [up to and including]	210	205	180	192
[SV3] Moderate	125	118	149	183
[SV4] Severe	65	81	77	100

The total number of projects using fish (other than zebra fish) declined somewhat for the first three years, and then increased again in 2021.

Table 4: Number of projects using all other species

	2018	2019	2020	2021
Total number of unique projects	94	59	52	63
Number of projects represented within each severity category				
[SV1] Non-recovery	18	4	3	4
[SV2] Mild [up to and including]	62	40	34	48
[SV3] Moderate	22	17	15	16
[SV4] Severe	8	8	4	4

The number of projects using animals other than fish decreased in 2019 and since then has been relatively stable.

Purposes

Tables 5 and 6 display the number of animals used in Norway for purposes defined by the EU.

a. All species

Table 5: Total number of animals used by purpose by year

Purpose of use	2018	2019	2020	2021
Translational/ Applied research	759 924	654 907	838 407	1 384 130
Basic research	859 179	491 303	403394	86 249
Preservation of species	9 497	4 034	27 913	470 668
Protection of the natural environment in the interests of the health or welfare of human beings or animals	17 858	91 320	106 211	19 373
Regulatory use	34 728	30 762	36 455	31 871
Maintenance of colonies of established genetically altered animals, not used in other procedures	4 186	8 136	8 399	14 380
Education	1 026	788	1 262	1 954
Forensic enquiries	251	345	0	0
Total	1 686 649	1 281 595	1 422 041	2 008 625

b. Fish

Table 6: Total number of fish (other than zebra fish) used by purpose by year

Purpose of use	2018	2019	2020	2021
Translational/ Applied research	743 899	635 651	821 730	1 360 704
Basic research	756 827	406 220	323 243	25 202
Preservation of species	6 545	3 451	27 586	469 475
Protection of the natural environment in the interests of the health or welfare of human beings or animals	13 659	90 642	104 210	17 379
Regulatory use	33 880	29 613	35 332	31 035
Maintenance of colonies of established genetically altered animals, not used in other procedures	0	0	1 400	0
Education	163	64	64	142
Forensic enquiries	0	0	0	0
Total	1 554 973	1 165 641	1 313 565	1 903 937

Batch testing and other regulatory and quality control purposes are among the uses where severity is the highest for fish. There is no indication of a downward trend for the number of fish used for these purposes (Figures 8 and 9):



Figure 8: Severity categories in regulatory use and quality control for fish by year

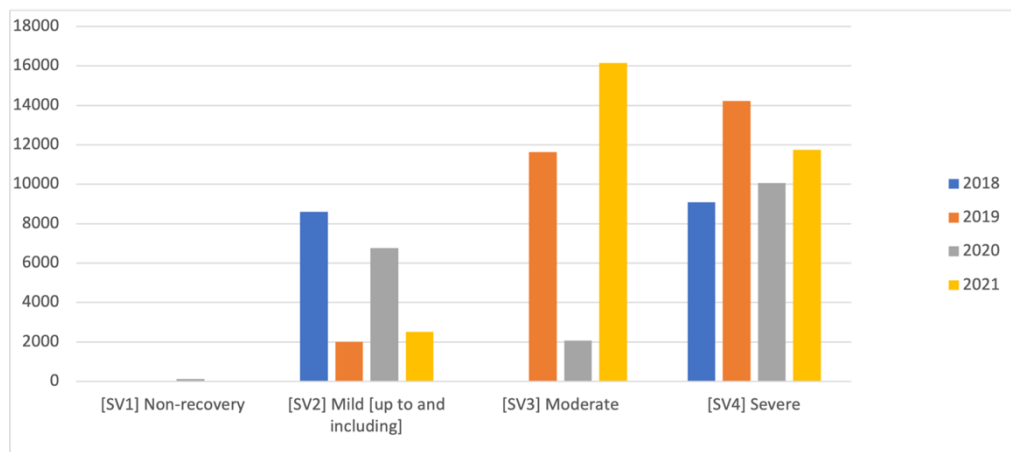


Figure 9: The number of Atlantic salmon in regulatory use and quality control by severity category and year

Graphical representation of animal use organised by purposes

We have developed a Sankey diagram¹³ that represents the allocation of species to different purposes. Figure 10 illustrates how the Sankey diagram can be used to present the species used most (by numbers) for the most frequently used purposes, for all four years (2018-2021).

An interactive version of this Sankey diagram is available on:

<https://norecopa.no/statistics>

On this webpage, the number of **Species** and **Purposes** displayed can be adjusted. Filters for genetic status, individual years and severity categories can also be used.

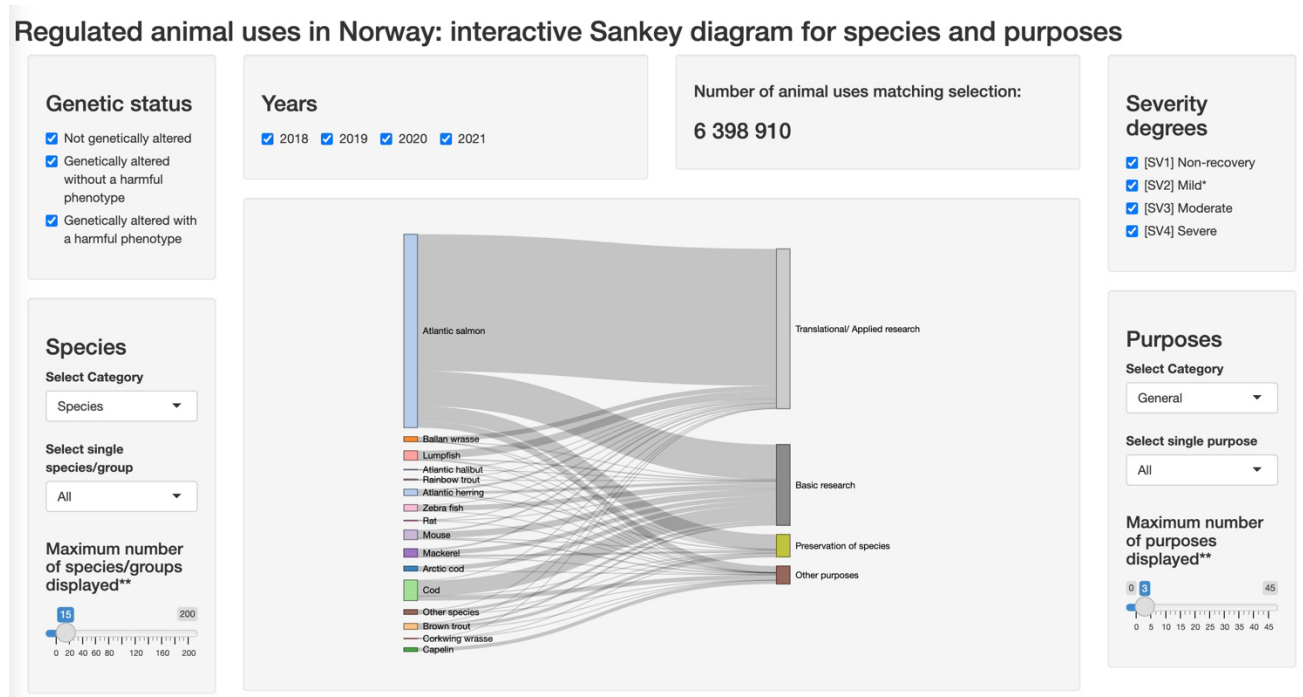


Figure 10: Sankey diagram of animal use organised by purposes for 2018-2021

¹³ https://en.wikipedia.org/wiki/Sankey_diagram

Genetic status

Animals used in procedures are classified by the EU in three categories, according to their genetic status:

- [GS1] Not genetically altered
- [GS2] Genetically altered without a harmful phenotype
- [GS3] Genetically altered with a harmful phenotype

a. All species

The vast majority (96.2%) of animals used for the period 2018-2021 were not genetically altered in any way (GS1; Table 7). There is no clear trend in increase or decrease of the size or relative numbers of the three genetic categories.

Table 7: Percentages of animals in each genetic category (all species)

Genetic status	2018	2019	2020	2021	Total
[GS1] Not genetically altered	97.1%	94.8%	95.1%	97.0%	96.2%
[GS2] Genetically altered without a harmful phenotype	2.7%	4.4%	4.3%	2.6%	3.4%
[GS3] Genetically altered with a harmful phenotype	0.2%	0.8%	0.6%	0.4%	0.5%
Total of all animals used	100.0%	100.0%	100.0%	100.0%	100.0%

Mice and zebra fish represent the majority of genetically altered animals, with and without a harmful phenotype (Table 8). However, a few other species were also genetically altered, notably the Atlantic salmon and the rat. This table includes all genetically altered species in the data for the four years.

Table 8: Number of animals used for all species with genetically altered status (totals from all four years)

Species	[GS1] Not genetically altered	[GS2] Genetically altered without a harmful phenotype	[GS3] Genetically altered with a harmful phenotype
Mouse	84 357	113 430	22 397
Zebra fish	59 665	83 377	4 765
Atlantic salmon	4 381 892	17 158	2 120
Rat	14 227	1 114	942
Lumpfish	214 629	181	0
Ballan wrasse	112 866	10	0
Pig	2 531	12	0
Grand Total	4870167	215282	30224

b. Mice

Genetically altered mice have increased both in numbers and as a proportion of the total number of mice used over the four years of the analysis (Figure 11).

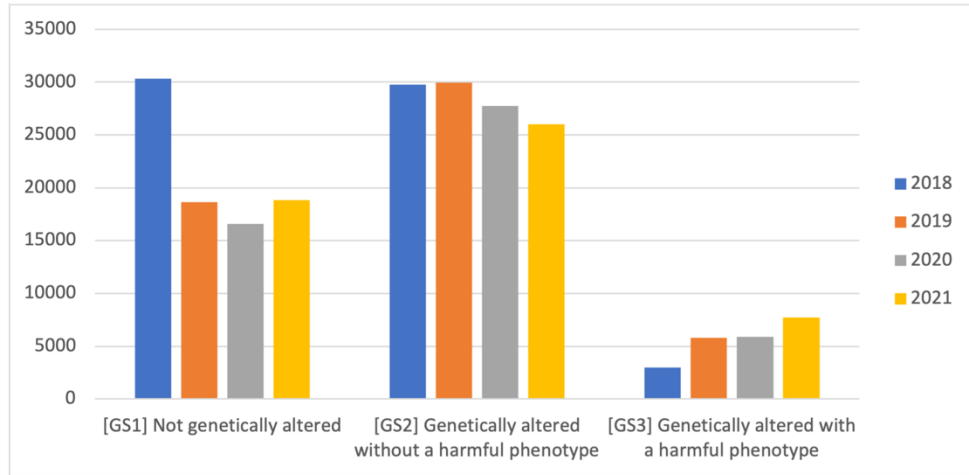


Figure 11: Number of mice used by genetic status (all four years)

c. Zebra fish

Zebra fish show a similar pattern of increase in genetically altered animals, mostly among non-harmful phenotypes (Figure 12). However, the trend is less clear than in mice.

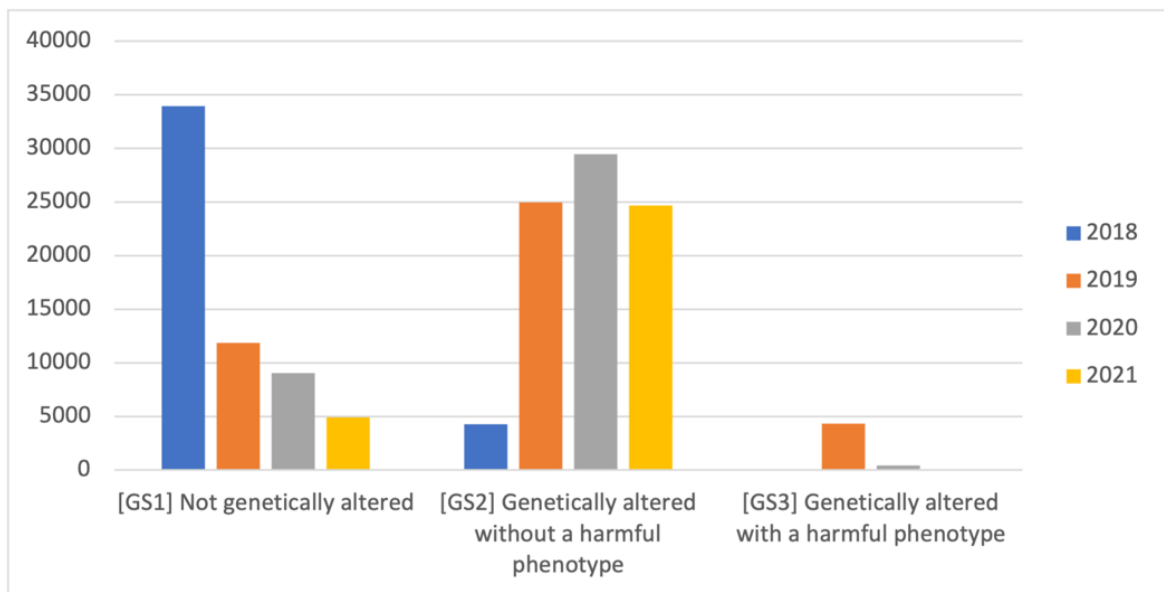


Figure 12: Number of zebra fish used by genetic status (all four years)

Re-use of animals

Re-use can be within the same project or in two separate projects, and it is regulated at the level of the procedure. Animals that are re-used remain a very small fraction of the total number of animals in Norway. A total of 21,330 animals were re-used over the four years of this analysis (Tables 9 and 10).

There is no clear trend of an increase or decrease, since 17,764 of the re-uses occurred in just one year (2018). This group is dominated by re-uses that resulted in mild severity. There were no re-uses for animals in the most severe category (SV4). Re-use is specifically regulated, both by Directive 2010/63/EU¹⁴ and the Norwegian Regulation¹⁵.

Table 9: Number of re-uses of animals by severity category and year for all species

Severity	2018	2019	2020	2021	All years	
					animals	percentage
[SV1] Non-recovery	5 722	356	40	0	6 118	28.7%
[SV2] Mild [up to and including]	11 975	418	1 674	793	14 860	69.7%
[SV3] Moderate	67	80	140	65	352	1.7%
[SV4] Severe	0	0	0	0	0	0%
Total	17 764	854	1 854	858	21 330	100%

The data does not track the severity of the initial use of the animals, so the severity indicated in this Table indicates the re-use.

Over the four years of the dataset, nearly 70% of the animal uses that were labelled as 're-uses' were in the Mild severity category.

Very few animals (just under 2%) were re-used for moderately severe procedures, and none were re-used for severe procedures.

Table 10 lists all the species where re-use was practised.

¹⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0063&from=EN> (Article 16)

¹⁵ https://lovdata.no/dokument/SF/forskrift/2015-06-18-761#KAPITTEL_3 (§17)

Table 10: Number of animals re-used by species and year

Species	2018	2019	2020	2021	Total
Atlantic salmon	6 402	461	15	11	6 889
Zebra fish	4 500	64	1 214	212	5 990
Mouse	4 278	24	116	3	4 421
Brown trout	2 398				2 398
Goat				404	404
Arctic cod	52	82		100	234
Sheepshead minnow			210		210
Svalbard reindeer	65	106			171
Sheep	15	6	24	16	61
Rock ptarmigan		53			53
Dog	6	44	1	1	52
Mink				40	40
Elk				30	30
Black-legged kittiwake	22				22
Northern bat	1	9	5	5	20
Pig	7			10	17
Arctic tern	16				16
Atlantic halibut				10	10
European plaice				10	10
Rat	2	1		6	9
Eurasian Tundra Reindeer			4		4
Hooded seal		3			3
Beluga whale		1			1
Grand Total	17 764	854	1 854	858	21 330

Influence of individual projects

Apparent trends in severity over the short timeframe of this analysis should be considered provisional until data from more years become available. A few large projects may distort yearly averages for individual species, groups of species and research areas, giving the false impression of an established pattern.

Overviews of the distribution of project sizes and use in the different severity categories provide a more refined representation of where efforts might be applied to improve animal welfare. Analyses at project level are also needed.

This section presents figures that illustrate the actual severities of use resulting from all the projects per year, and for individual projects. The severity is represented by the location of a project (or group of projects) on a Ternary plot¹⁶, which is a triangle showing the relative composition along three dimensions. We have combined severity categories 1 and 2 into one dimension, to reduce the description of severity to three numbers, thereby avoiding the use of three-dimensional figures.

The diameter of the bubbles in a Ternary plot is proportional to the total number of animals used in the project (or group of projects). The colour of the bubble represents the year, allowing trends over time to be observed.

In the following subsections, we present Ternary plots for:

- all species combined in one plot,
- Atlantic salmon, rainbow trout and mice - in separate plots.

a. Ternary plots for all species

In the left-hand panel of Figure 13, each bubble represents all the projects performed on one species for a given year. For example, the large brown bubble depicts all the uses of Atlantic salmon in 2021. The location of the bubble (very near the bottom axis, and on the 0.4 mark on the line between SV3 and SV1+2) indicates that there were very few projects in category SV4 (severe) for salmon in that year, and that 40% of animal uses were in SV1 or SV2 (non-recovery or mild), the rest being SV3 (moderate).

In the right-hand panel of Figure 13, each bubble represents an individual project. Most projects are not visible because of the scale necessary to represent one large project on Atlantic salmon represented by the brown bubble at the bottom right corner. To understand the importance of this single project, it is easiest to focus on salmon projects alone (see Figure 14, page 22).

¹⁶ https://en.wikipedia.org/wiki/Ternary_plot

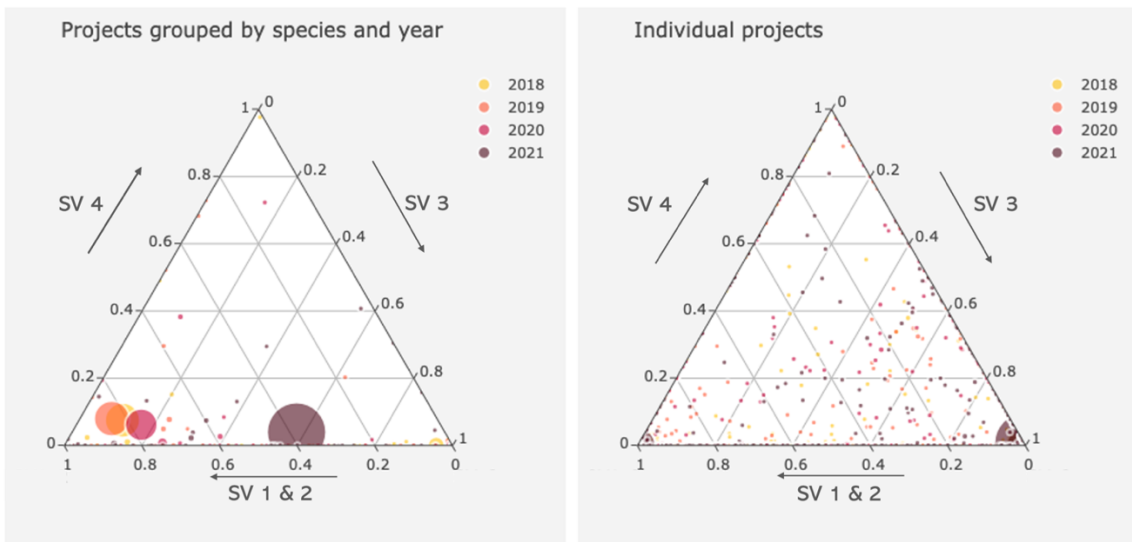


Figure 13: Ternary plot for all projects

SV1 & 2 = the ratio of animals used in severity categories 1 and 2 (non-recovery and mild)

SV 3= the ratio of animals used in severity category 3 (moderately severe)

SV 4= the ratio of animals used in severity category 4 (severe)

b. Atlantic salmon

On the left-hand panel of Figure 14, each bubble represents all the projects that year for the species. In the case of atlantic salmon, both the severity and number of projects increased in 2021, with a dramatic shift towards moderately severe projects (SV3). The right-hand panel, with one bubble per project, shows that this is not due to increased severity in all projects, but that it was the result of one very large project of almost half a million salmon in the moderately severe category (SV3).

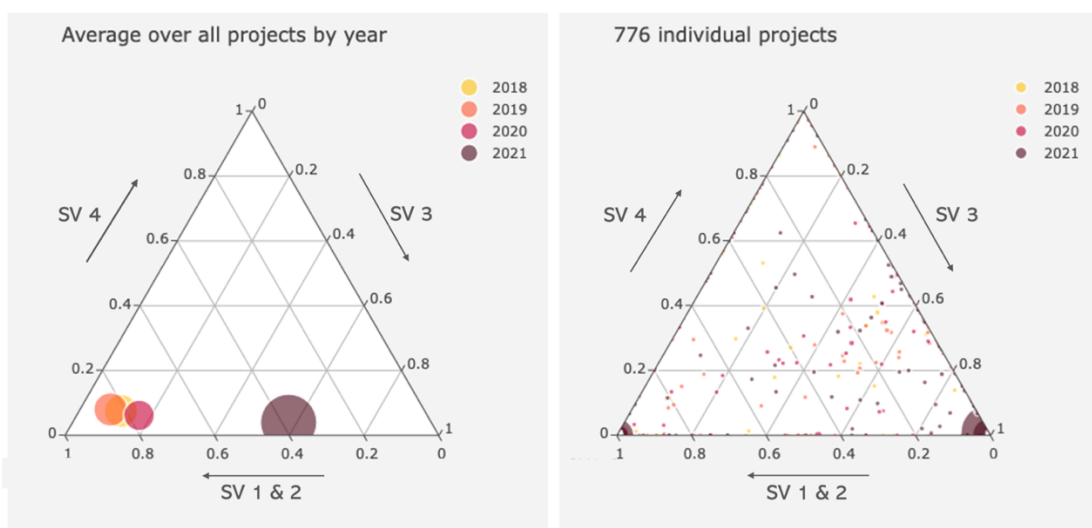


Figure 14: Ternary plots for Atlantic salmon

c. Rainbow trout

As in Figure 14, the bubbles on the left-hand panel of Figure 15 represent all the projects per year for rainbow trout. The number of projects was highest in 2020, and all years were characterised by projects with high severity. The right-hand side panel shows that the 20 projects in the 4-year period contained many animals in the two most severe categories (SV3 and SV4), although the situation in 2021 was somewhat better than the previous years.

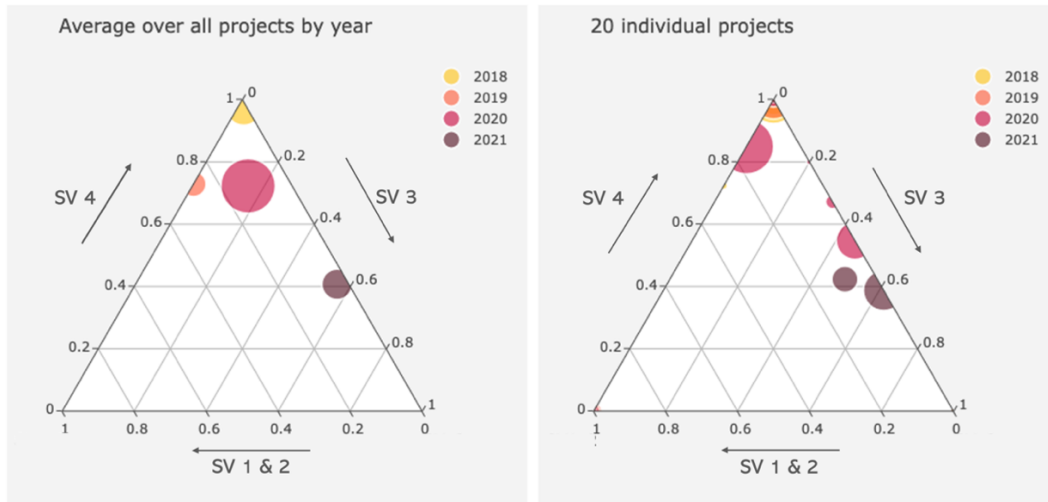


Figure 15: Ternary plots for rainbow trout

d. Mice

As in Figures 14 and 15, the bubbles on the left-hand panel of Figure 16 represent all the projects per year for mice. These were on average considerably milder in their severity than the projects performed on Atlantic salmon and rainbow trout. The right-hand side panel shows that relatively few projects contained high proportions of animals in the most severe category (SV4).

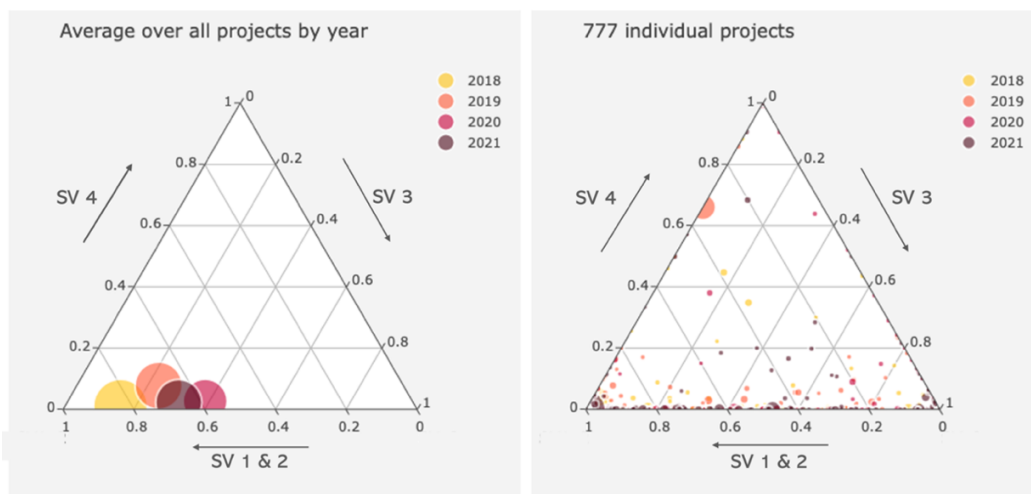


Figure 16: Ternary plots for mice

Concluding remarks

The aim of this work was to inform both the Norwegian authorities and researchers, and to identify where the most effective measures can be applied to reduce both the total number of animals and the severity of the scientific procedures which must still be performed.

The number of animals used for research purposes in a country is, of course, a reflection of both the general level of scientific activity and the number of animals in individual projects. Norway's statistics are influenced mainly by the needs generated by commercial fish farming. However, the numbers of traditional laboratory animals are also relatively high compared to neighbouring countries.

The large use of animals in Norway creates a special responsibility to work for implementation of the three Rs. Norway should be a leader in the development of alternative methods, especially within the areas where many animals are used.

The numbers of uses resulting in the two most severe categories ('moderate' and 'severe') show no sign of diminishing, and their figures for 2021 are by far the highest in the 4-year period. In addition, the uses resulting in non-recovery and mild levels of severity both show steady relative decreases from year to year. This is not in the interests of Refinement.

The official statistics from recent years give only a very superficial view of animal use in Norway¹⁷. This report gives a more detailed analysis and will make it easier to identify trends and areas of concern in the future.

Acknowledgements

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We thank the Board of Norecopa for their advice, and Susanna Louhimies of the EU Commission for helping us to review the terminology in this report in reference to EU Directive 2010/63/EU and its guidance documents.

¹⁷ <https://norecopa.no/no/lovverket/statistikk>

Appendix

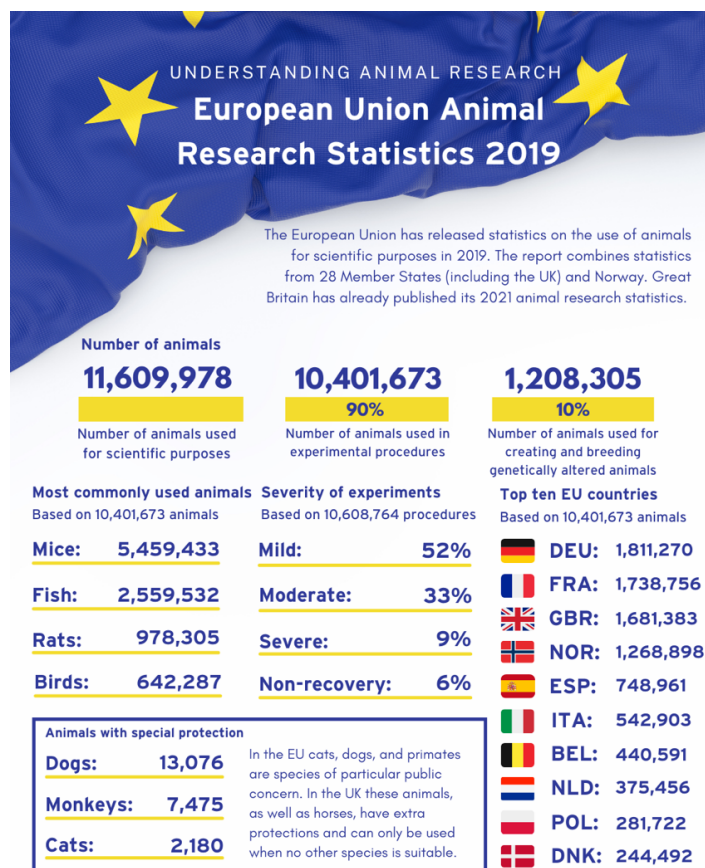
A1: EU's definitions of the severity categories¹³

Category symbol and name	Definition
[SV1] Non-recovery	Procedures which are performed entirely under general anaesthesia from which the animal shall not recover consciousness shall be classified as 'non-recovery'.
[SV2] Mild [up to and including]	Procedures on animals as a result of which the animals are likely to experience short-term mild pain, suffering or distress, as well as procedures with no significant impairment of the well-being or general condition of the animals shall be classified as 'mild'.
[SV3] Moderate	Procedures on animals as a result of which the animals are likely to experience short-term moderate pain, suffering or distress, or long-lasting mild pain, suffering or distress as well as procedures that are likely to cause moderate impairment of the well-being or general condition of the animals shall be classified as 'moderate'.
[SV4] Severe	Procedures on animals as a result of which the animals are likely to experience severe pain, suffering or distress, or long-lasting moderate pain, suffering or distress as well as procedures that are likely to cause severe impairment of the wellbeing or general condition of the animals shall be classified as 'severe'.

See also the working documents on a Severity Assessment Framework and Illustrative Examples endorsed by the National Competent Authorities of the EU Member States for the implementation of Directive 2010/63/EU:

https://ec.europa.eu/environment/chemicals/lab_animals/interpretation_en.htm

A2: Infographic from *Understanding Animal Research* showing the latest EU figures on animal use (the year 2019)¹⁸



As can be seen from the infographic, Norway used the fourth highest number of research animals in 2019. The individual figures for Norway¹⁹ are:

Mice:	54,350	Mild:	68% (873,629)
Fish:	1,206,789	Moderate:	21% (274,838)
Rats:	3,324	Severe:	7% (94,896)
Birds:	12,754	Non-recovery:	3% (38,232)
Dogs:	66		
Monkeys:	0		
Cats:	1		

In 2020 and 2021 the Norwegian figures were even higher: totals of 1.4 million and 2.0 million, respectively. The number of animal uses in the two most severe categories taken together were also higher, while the numbers in the two mildest categories decreased (see Table 1).

¹⁸ <https://www.understandinganimalresearch.org.uk/news/eu-wide-animal-research-statistics-2019>

¹⁹

https://www.mattilsynet.no/dyr_og_dyrehold/dyrevelferd/forsoksdyr/bruk_av_dyr_i_forsok_i_2019.40065/binary/Bruk%20av%20dyr%20i%20forsok%20i%202019

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