

Manual for entering data to the nature index database

Version 2.1

Bård Pedersen and Pål Kvaløy

Nature-index of Norway Admin Home Indicators Areas Values User Log off

UserID: 125 IndicatorID: 24 Indicator name: Brakkvannsreke

Select area for data input

DEF brakkvannsreke

- Østfold
- Vestfold
- Akershus, Buskerud
- Telemark
- Aust-Agder
- Vest-Agder

Select point in time for visualization

2010

Download/Upload

[Download excel file with areas and values for this indicator](#)

Select a xml file to Upload

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Version 2.1

Bård Pedersen and Pål Kvaløy

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COVER PICTURE

Visualization tool on the value page.

State of Atlantic ditch shrimp (*Palaemonetes varians*) in 2010.

KEY WORDS

Norwegian nature index, user's manual, IT platform, nature index database, web-interface for data entry, nature index web-site, biodiversity

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Naturindeks for Norge, brukermanual, IT plattform, naturindeksdatabasen, nettbasert innlegging av data, nettbasert innsynsløsning for naturindeks, biodiversitet.

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Abstract

Pedersen, B. and Kvaløy, P. 2015. Manual for entering data to the nature index database. Version 2.0 – NINA Report 1139. 52 pp.

This manual guides the user in how to enter, edit and update data and other information about the indicators they are responsible for in the nature index database. A dedicated website has been developed for the purpose. The website also includes features for uploading images, documents and links to documents to the database.

The database is open for data entry from users once a year. The period is announced directly to the users. To log in and get access to the database users need to be registered with a username and password. Users are responsible for a defined set of indicators, for which they get access to read and enter data. Thus, read and write access to indicator data is user-specific.

The user may access six “pages” on the interface, the “Home”, “Indicator”, “Areas”, “Values”, and “User” pages. Initially, users must use the “Login” page to get access to the other five. The “Home” page contains information about updates of the interface and provides access to this manual. The “User” page contains fields for entering/revising user information.

The “Indicator” page is used to select an indicator and enter or edit various information about the indicator to the database. The page contains fields for entering indicator metadata, sensitivity to pressure factors, and ecosystem affinity. There is also a link to a popup window for uploading or linking to documentation in electronic form, i.e. reports, pictures, web-pages etc.

On the “Areas” page one delineates and edits the spatial units from where indicator data is collected.

Users enter indicator observations and reference values for the selected indicator on the “Values” page. Data may be entered to the database either directly on the “Values” page or by importing them from Excel files. A tool for visualization and proofreading of stored data on maps is also available on the page.

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Sammendrag

Pedersen, B. og Kvaløy, P. 2015. Manual for innlegging av data til naturindeks databasen. Versjon 2.0 – NINA Rapport 1139. 52 s.

Nettstedet for innlesing av data til naturindeksbasen er utviklet som et grensesnitt der den enkelte ekspert kan legge inn, redigere og oppdatere observasjoner og annen informasjon om de indikatorene vedkommende er ansvarlig for. Nettstedet inneholder også funksjoner for opplasting av bilder, dokumenter og lenker. Disse skal i neste omgang presenteres og gjøres tilgjengelig for publikum på et eget nettsted. Innlesingsgrensesnittet har adresse <http://naturindeks.nina.no/>. For å få tilgang til nettstedet og naturindeks-databasen må eksperten på forhånd være registrert med brukernavn og passord. Ved registrering gis eksperten lese- og skrivetilgang kun til de indikatorene vedkommende er ansvarlig for. Innlogging til grensesnittet tillates i en periode hvert år, der nye data kan legges inn og der alle innlagte data kan redigeres. Grensesnittet er på engelsk.

Nettstedet består av seks «sider» som brukeren har tilgang til. I første omgang må brukeren benytte innloggingssiden for å få tilgang til de fem andre. Forsiden inneholder opplysninger om nye versjoner og oppdateringer av grensesnittet og gir tilgang til denne brukermanualen.

Indikatorsiden benyttes til å velge indikator og lese inn ulike opplysninger om den. Den inneholder felter for innlesing av indikatorens metadata, sensitivitet ovenfor ulike påvirkningsfaktorer og dens tilhørighet til de ni hoved-økosystemene. Indikatorsiden inneholder også en lenke til et popup vindu for opplasting av bilder, rapporter og annen dokumentasjon som ligger til grunn for indikatorverdiene og de andre opplysningene som er lagt inn i databasen.

Områdesiden benyttes til å definere og redigere de geografiske områdene indikatorobservasjonene gjelder for.

Observasjoner og referanseverdier for valgt indikator leses inn på databasens verdiside, enten direkte i en tabell på siden eller via import fra Excel. På verdisiden inngår i tillegg et verktøy for visualisering og korrekturlesing av innleste data på kart.

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Foreword

Norwegian Institute for Nature Research (NINA) have developed a web-based information system for recording, storage and presentation of data used for calculating the nature index and the results from the calculations. The system consists of an SQL relational database for storing indicator observations and other data as well as results from index calculations done in R. It further includes a web-interface for entering data to the database where the individual expert can update information for those indicators the expert is responsible for, and one set of R-scripts that calculate the nature index and analyze raw data and results. In addition, one is currently constructing a website for presentation of results and background data to the public.

The present report contains the manual for the web-interface for entering data. Pål Kvaløy has designed and programmed the interface. We regularly update both the manual and the interface as the information systems related to nature index are further developed. The report contains the current, second version of the manual.

The present manual is for the Norwegian implementation of the nature index information systems. The National Biodiversity Institute of Costa Rica (INBio), in collaboration with NINA, have tested the nature index methodology on Costa Rican forest ecosystems and adapted the Norwegian IT platform to Costa Rican conditions. As part of the project, INBio translated the present manual into Spanish and adopted it to the Costa Rican implementation.

The interface have been developed on assignment for the Norwegian Environment Agency, contracts 12040070, 13040047, 14040048, all under the agreement "Naturindeks, Rammeavtale for utvikling av naturindeks 2011-2015" between the agency and NINA dated 2011.10.28.

We thank Olav Skarpaas, Heidi Myklebost, Signe Nybø, together with all the experts who use the interface for entering their data, for constructive discussions, comments, and suggestions that have led to improvements of both the interface and the manual.

Trondheim April 2015

Bård Pedersen
Pål Kvaløy

1 Introduction

This manual is developed for experts and others (hereafter referred to as “users”) who are going to enter data for biodiversity indicators into the nature index database (Pedersen & Kvaløy 2015). The manual describes the structure of the web-interface for entering data, describes information that should be entered in the various input fields, and explains how to enter these data.

You will recognize chapter titles as elements found in the web-interface or as operations you are about to perform on the interface. You may therefore navigate to the appropriate chapter in this manual by clicking the relevant title in the content list above. The manual further contains a number of helpful internal and external links.

1.1 Software platform

Server side:

The servers for the Nature Index run on Microsoft software. The database server is a Microsoft SQL Server 2012 running on a Windows Server 2008 platform. The web server is a Microsoft Internet Information Server running on a Windows Server 2012 platform. The programming language used on the server side is C#. Client access to server functionality are implemented with Web API services.

Client (users) side:

The nature index webpages use a combination of CSS, JavaScript and HTML5. Maps are displayed with the Leaflet map engine, and the client side MVM model is implemented with Knockout. The pages are tested on Google Chrome and Microsoft Internet Explorer – newer versions. Other modern HTML5 browsers (such as Opera and Firefox) will probably work just fine. JavaScript must be turned ON in the browsers security settings.

Those with web-browsers older than Internet Explorer 9, or similar, are encouraged to upgrade their browsers before trying to access the Nature Index.

1.2 Access

The web-interface for entering data is accessed on the following address:

<http://naturindeks.nina.no/>

The database will be open for data entry from users once a year. The period is announced directly to the users. Current access-status is displayed on the [Home](#) page.

To log in and get access to the database you need to be registered as a user with a username and password. If you are a new user wishing to contribute, please contact [Else Marie Løbersli](#), [Bård Pedersen](#), or [Signe Nybø](#). Our policy is to only allow clearly recognized experts to document the Nature index database.

Users are responsible for a defined set of indicators, for which they get access to read and enter data. Thus, read and write access to indicator data is user-specific. Users wishing to expand or restrict the set of accessible indicators for their profile should contact one of the [system administrators](#), Siw Elisabeth Berge, Heidi Myklebost, Bård Pedersen.

1.3 Interface structure

The interface consists of six pages that may be accessed by the user,

- the [Home](#) (or front) page which the user will first encounter,
- the [Log in](#) page for getting access to the database,
- the [Indicators](#) page for choosing an indicator to work with and entering indicator information,
- the [Areas](#) page for defining/editing indicator specific geographical units,
- the [Values](#) page for entering/editing reference values and unscaled observations of the indicator in these geographical units,
- the [User](#) page for entering/editing user information.

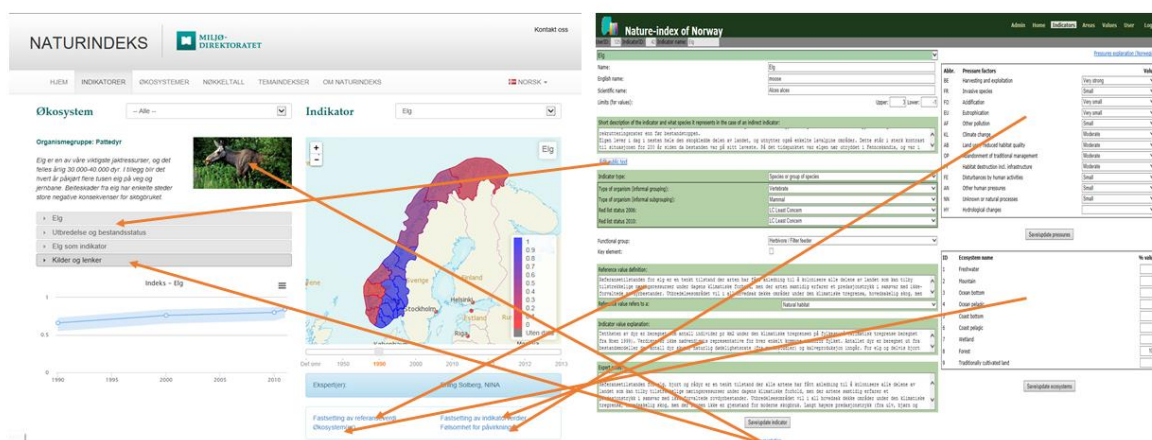
1.4 How to proceed – in brief

After you have logged in you are required to choose one of the indicators assigned to you on the [Indicators](#) page, and fill in missing [metadata](#) for it. You may also update or correct metadata entered earlier on this page.

Then, optionally if not already done or if you want to revise old spatial delineations, navigate to the [Areas](#) page to document the area where the indicator is relevant (the [definition area](#)), and [delineate geographical units](#) (hereafter simply referred to as areas) within the definition area for which you will enter [values](#) for this indicator. You have to define at least one such area.

Values for each of the indicators' areas are entered on the [Values](#) page. These values can either be observations, measurements, model output through e.g. interpolation or extrapolation, or expert opinion. Optionally, [data may be entered via Microsoft Excel](#). The Values page includes a tool for both creating appropriate Excel work-sheets as well as for importing data from the same work-sheets to the database. The Values page also has a [visualization tool](#) to help proofreading the entered data.

1.5 Website for presenting the nature index and indicator data to the public



[Norwegian Environment Agency](#) is preparing a new web-site, here referred to as naturindeks.no, that will present the Nature Index methodology and results (Pedersen & Kvaløy 2015). In addition, it will provide insight into the quality and amount of data the index is based on. The new web-page is intended for the public. It will directly display some of the information that users enter into the nature index database (see illustration below). Information displayed includes the [indicator's name](#), [its description](#), descriptions of the [data set](#) and how [reference values are determined](#), [pressure factors](#), [ecosystem affinities](#) and [area names](#). In addition, pictures, links and documents uploaded in the [Documentation pop up window](#) will be made available to the public on naturindeks.no. It is therefore important that the various descriptions of indicators, reference values and data are formulated in a popular and easily accessible style. The data themselves (values and reference values) will not be displayed. The web-site, when completed, will appear on the address www.naturindeks.no.

[A prototype](#) is available on the net. You may consult the prototype in order to review how your input in these fields will be displayed on naturindeks.no. Note however that a large part of the information displayed by the prototype as of writing is from a test database that contains some junk data as well as invented data.

2 Getting started – the Home, Log in and User pages.

2.1 Home page

The **Home** page displays current status of the database and current accessibility. It further contains a brief instruction on how to proceed in order to get access to indicators and enter new data to the database. There is also a log containing information about the most recent updates of the web-page.

Nature index for Norway

Database: Naturindeks_2012 [Open for data entry](#) [Access for admins](#)

To register data you have to log in. Use the link "Log in" in the upper right corner. After you have logged in you are required to choose one of the indicators assigned to you, and fill in missing metadata for it.

When an indicator is chosen you have to define the area where this indicator exists - the "definition area". Inside the definition area you have to define at least one area for registration of data.

Values for each of the indicators' areas are entered on the page "Values". During, or after, registering the values you may look at how the normalized values are distributed on the indicators areas using the choice "Select point in time for visualization"

Normalized values are shown on a scale from **red = 0** to **blue = 1**.
The reference values are scaled from **red** = lowest reference value, to **blue** = highest reference value.

Changelog

Date	Change	UserID
19.02.2014	New document "Konkretisering av referansetilstand" on "Home" page after logging in	1
17.02.2014	Nature Index is open for data entry	1
12.02.2014	Database changed from test to production	1
11.02.2014	Indicators: New field "Expert Notes" for experts - not shown public	1
30.01.2014	Leaflet map engine updated to version 0.7.2: +Fixed a bug that appeared with Chrome 32 update that made all mouse events shifted on scrolled pages	1
29.01.2014	Pressures explanation in Norwegian - "Indicators"	1
23.01.2014	Excel export/import prototype - not finished!!	1
23.01.2014	Fix on "Values" page for IE9 and below	1
14.01.2014	Values: "Visualization" don't block Save button on small screens	1
11.12.2013	This is the new naturindeks.nina.no	1

Click the **Log in** tab at the right end of the top menu to enter the **Log-in** page. After log-in you are automatically redirected to the **Home** page where this user manual and other supporting documents now are available.

Nature index for Norway

Database: Naturindeks_2012 [Open for data entry](#) [Access for admins](#)

To register data you have to log in. Use the link "Log in" in the upper right corner. After you have logged in you are required to choose one of the indicators assigned to you, and fill in missing metadata for it.

When an indicator is chosen you have to define the area where this indicator exists - the "definition area". Inside the definition area you have to define at least one area for registration of data.

Values for each of the indicators' areas are entered on the page "Values". During, or after, registering the values you may look at how the normalized values are distributed on the indicators areas using the choice "Select point in time for visualization"

Normalized values are shown on a scale from **red = 0** to **blue = 1**.
The reference values are scaled from **red** = lowest reference value, to **blue** = highest reference value.

Documents

[Konkretisering av referansetilstand \(pdf\)](#)
[Manual for entering data to the Nature Index \(pdf\)](#)

Changelog

Date	Change	UserID
19.02.2014	New document "Konkretisering av referansetilstand" on "Home" page after logging in	1 Delete
17.02.2014	Nature Index is open for data entry	1 Delete
12.02.2014	Database changed from test to production	1 Delete
11.02.2014	Indicators: New field "Expert Notes" for experts - not shown public	1 Delete
30.01.2014	Leaflet map engine updated to version 0.7.2: +Fixed a bug that appeared with Chrome 32 update that made all mouse events shifted on scrolled pages	1 Delete
29.01.2014	Pressures explanation in Norwegian - "Indicators"	1 Delete
23.01.2014	Excel export/import prototype - not finished!!	1 Delete
23.01.2014	Fix on "Values" page for IE9 and below	1 Delete
14.01.2014	Values: "Visualization" don't block Save button on small screens	1 Delete
11.12.2013	This is the new naturindeks.nina.no	1 Delete

[Submit](#)

2.2 Log in page

Contain fields for entering necessary log-in information (User Name and Password) to get access to the database, and a link for receiving the current personal password by mail in case one does not remember the password.

User Name is the e-mail address that has been entered under User information on the User page. Click the Log In button in the middle of the page after entering log-in information. Then you will automatically re-enter the Home page and get access to the **Indicators-** and **User** pages.

Click the “Forgotten password?” link and follow instructions in case you have forgotten your password and need to access the database. The password is stored encrypted in the database, and there is no way of finding out what it is, even for administrators. Users have to use the “Forgotten password?” link to reset their password.

After you have logged in your user ID is displayed to the left under the top menu.



2.3 User page

Click the **User** tab when logged in, in order to enter this page

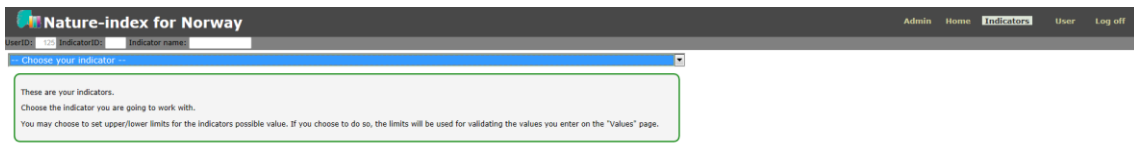
The page displays basic user information (Internal user ID and date for last login) and contains fields for entering/revising your user information (name, phone, institution, e-mail) and for changing the password.

Click the Update button after you have entered new or revised user information in order to store this information in the database. Old information will be deleted from the database. If you forget to click the button the new information will not be stored, while the old information remains and will be displayed next time you enter this page. Click the Update password button after you have entered both old and new passwords as well as repeated the new one, in order to store the new password in the database. If you forget to click the button, the new password will not be stored while the old one remains valid.

User information

UserID:	<input type="text" value="125"/>
Last login:	<input type="text" value="21.02.2014"/>
Email:	<input type="text" value="no.name@nina.no"/>
First name:	<input type="text" value="Ola-O a"/>
Given name:	<input type="text" value="Lia"/>
Phone:	<input type="text"/>
Institution:	<input type="text" value="NINA"/>
	<input type="button" value="Update"/>
Old password:	<input type="password"/>
New password:	<input type="password"/>
Repeat new password:	<input type="password"/>
	<input type="button" value="Update password"/>

3 Indicators page



Choose one of the indicators assigned to you from the drop-down list. This will give you access to the various fields for entering indicator information as well as the [Areas](#) and [Values](#) pages for the chosen indicator.

The page contains fields for entering Indicator metadata, sensitivity to [Pressure factors](#), and [Ecosystem affinity](#). There is also a link to a [popup window for uploading or linking to documentation](#) in electronic form, i.e. reports, pictures, web-pages etc.

Indicator metadata

Pressure factors

Abbrev.	Pressure factors	Value
BE	Harvesting and exploitation	Very strong
BR	Invasive species	Small
FD	Acidification	Very small
EU	Eutrophication	Small
AF	Other pollution	Moderate
KL	Climate change	Moderate
AB	Land use / reduced habitat quality	Moderate
OP	Abandonment of traditional management	Moderate
FY	Habitat destruction incl. infrastructure	Moderate
FE	Disturbances by human activities	Small
AN	Other human pressures	Small
UN	Unknown or natural processes	Small
HY	Hydrological changes	

Link to Documentation pop-up window

Ecosystem affinities

ID	Ecosystem name	% value
1	Freshwater	
2	Mountain	
3	Ocean bottom	
4	Ocean pelagic	
5	Coast bottom	
6	Coast pelagic	
7	Wetland	
8	Forest	100
9	Traditionally cultivated land	

3.1 Indicator metadata

New or edited data and choices from drop-down menus are not automatically stored in the nature index database. In order to store new or edited input, click the [Save/update indicator](#) button

3.1.1 Norwegian name

Enter / edit the indicator's Norwegian name.

The content of this field will appear on naturindeks.no.

For indicators that represent species or other formal taxa such as genera, use approved Norwegian names as found in the [Species Names Database](#) at the Norwegian Biodiversity Information Centre (Norwegian Biodiversity Information Centre 2015). For other indicators, give descriptive and popularized indicator names, which are understandable to the public.

Capitalize first letter in the name. Remove any underscore-signs etc. that may appear in the name. Use Norwegian letters æ, ø, å, not adaptations to alphabets without these letters like ae, eu, aa.

3.1.2 English name

Enter / edit the indicator's English name.

For indicators that represent species or other formal taxa such as genera, use common English names as they appear in the Pan-European Species directories Infrastructure [EU Nomen](#) (de Jong 2010). Capitalize first letter in the name(s) according to the list (e.g. Trailing Azalea, Brown bear). Remove any underscore-signs etc. that may appear in the name.

3.1.3 Scientific name

Enter /edit the indicator's scientific name.

For indicators that represent species or other formal taxa, enter current scientific name. For other indicators no input should be entered.

3.1.4 Limits (for values)

(Optional)

Enter upper and lower limits for values the indicator may take (before scaling against the reference value) in case you want an automatic check against typing errors that result in unrealistic values, when you enter data on the [Values](#) page. If you enter such limits, you will not be able to store values entered on the **Values** page that are outside the interval given by lower and upper. Instead a warning message will be displayed.

3.1.5 Short description of the indicator

The content of this field will [appear](#) on [naturindeks.no](#).

Give a popular description (**in Norwegian**) of the indicator that introduces the indicator for the public. The indicator should be presented in a “management perspective” rather than in a “biological” one. The description should focus on issues like the current state of the indicator and its recent development, important drivers and threats, and/or management strategies / policies affecting the indicator etc. (see text box to the left and examples below).

For [species indicators](#) you should include a brief account of the species distribution and of relevant aspects of its ecology/biology. For [indirect indicators](#) one should in addition include a description of how the indicator is constructed, what sorts of organisms are involved, and/or what the indicator expresses.

The text should be partitioned into short paragraphs with informative subheadings (see examples below).

The text is intended to appear on [naturindeks.no](#). If needed, the text will be popularized and adapted to the format of the webpage and to the governmental regulations that legislate the [universal design of information and communication technology \(ICT\)](#) in Norway. An ongoing project at NINA does this task. The project team at NINA will consult the various experts regarding adaptation of the original text.

Contact: [Camilla Næss](#)

You may preview the adapted text on the [webpage prototype](#).

Mal – velg punktene som er relevante å ha med for arten eller naturtypen

Ingress – kort oppsummering av informasjon –forklar hvorfor arten/indeksen/naturtypen er en indikator.

Om arten/naturtypen

- Biologi/økologi som er relevant for indikatorstatus

Utbredelse/Habitat

- arten i økosystemet
- I tilknytning til andre arter/naturtyper?

Indikator

- Hvorfor er arten/naturtypen valgt som indikator?
- Hvordan påvirker arten omgivelsene?

Trusler og påvirkningsfaktorer

- Trusler mot indikatoren
- Indikator- / bestandsstatus

Forvaltningstiltak/reguleringer

Kilder og lenker

Examples:**Elvemusling**

NATURINDEKS MILJØ-DIREKTORATET Kontakt oss

HJEM INDIKATORER ØKOSYSTEMER NØKKELTALL TEMAİNDEKSER OM NATURINDEKS NORSK

Økosystem -- Alle -- Indikator Elvemusling

Organismegruppe: Mollusk

En bestand av elvemusling som opprettholder naturlig rekruttering vil være det synlige beviset på god vannkvalitet og god økologisk status.

- Biologi
- Utbredelse og bestandsstatus
- Trusler og påvirkningsfaktorer
- Elvemusling som indikator
- Kilder og lenker

Indeks - Elvemusling

Ingress

En bestand av elvemusling som opprettholder naturlig rekruttering vil være det synlige beviset på god vannkvalitet og god økologisk status.

Biologi

Elvemusling er en stor ferskvannsmusling (voksne individ kan bli 12-16 cm lange) som hovedsakelig lever i rennende vann. Elvemuslingens livssyklus omfatter et larvestadium som sitter på gjelene til laks eller ørret, et ungt stadium nedgravd i grusen og et voksent stadium synlig på elvebunnen. Muslingene forflytter seg i liten grad etter at de har etablert seg på elvebunnen. Spredning innad i vassdrag og mellom vassdrag skjer derfor mens muslinglarvene er festet til fisken.

Utbredelse og bestandsstatus

Elvemusling finnes utbredt i hele Norge i et belte langs kysten, men også et stykke innover i vassdragene og enkelte steder opp til 400-450 moh. Selv om vi ikke kjenner utbredelsen i detalj, har vi i dag opplysninger om elvemusling fra 525-550 lokaliteter. Elvemusling er klassifisert som "Sårbar" på den Nasjonale Rødlista, og arten er fredet mot all fangst. På den Globale Rødlista er den klassifisert som "Sterkt truet". Det er gjort beregninger som viser at Norge har nesten en tredel av de kjente gjenværende lokalitetene med elvemusling og mer enn halvparten av antall muslinger i Europa. Dette gjør elvemusling til en ansvarsart for Norge. Elvemuslingen har imidlertid forsvunnet fra om lag 20 % av de kjente lokalitetene også i Norge, og den har dødd ut fra store områder på Sørlandet. Det er samtidig påvist rekrutteringssvikt i om lag en tredel av lokalitetene med levende elvemusling. Dette er populasjoner som over tid vil bli redusert i antall og stå i fare for å dø ut. I tillegg er det nedsatt rekruttering i svært mange bestander, som gjør at bestandsutviklingen over tid blir negativ. Elvemusling er altså fortsatt til stede, men det skjer en "forgubbing" i bestandene. De fleste lokalitetene med gode, reproduserende bestander av elvemusling finnes i dag i Møre og Romsdal, Sør-Trøndelag, Nord-Trøndelag og Nordland fylker.

Trusler og påvirkningsfaktorer

Det er forringelse og ødeleggelse av leveområdene som er den største trusselen for muslingene. I tillegg vil alt som påvirker vertsfisken også påvirke elvemuslingen. Høy tilførsel av næringsstoff (eutrofiering), forurening, utryddelse eller reduksjon i bestander av vertsfisk, vassdragsregulering, kanalisering, bekkelukking, erosjon fra land- og skogbruksområder, snauhogst, drenering av myrer og annen utmark, giftutslipp og klimavariasjoner kan være viktige faktorer i dette bildet. Plukking av muslinger og perlefiske var tidligere en alvorlig trussel.

Elvemusling som indikator

Fordelen med å kunne anvende elvemusling som et ledd i naturovervåkingen er artens høye krav til vannkvalitet og habitat. Spesielt interessant er det at elvemuslingen kan oppnå en imponerende høy levealder (250-300 år). Selv om rekrutteringen har vært helt fraværende i mange år vil bestander av elvemusling kunne ta seg opp igjen så sant årsaken til bestandsnedgangen blir fjernet. Elvemusling kan fungere både som en indikator på artsrike miljøer og som en paraplyart (overlappende habitatkrav med andre kravstore arter). Elvemuslingen utgjør dessuten en viktig del av den naturlige vannrensingen i et vassdrag (hvert individ filtrerer 50 liter vann hvert døgn). Dette gjør at muslingen også kan betraktes som en nøkkelart (en økologisk viktig art som påvirker mange andre arter). En bestand av elvemusling som opprettholder naturlig rekruttering vil være det synlige beviset på god vannkvalitet og god økologisk status.

Forvaltningstiltak

Elvemusling er klassifisert som «Sårbar» på den Nasjonale Rødlista, og arten er fredet mot all fangst. Handlingsplanen for elvemusling som kom i 2006 presenterer mål, tiltak og organisering for forvaltning av elvemuslingen. Overvåkingsprogrammet for elvemusling (Miljødirektoratet) dokumenterer bestandstilstand og endringer i vassdragene.

Kilder og lenker

Artsdatabanken
 Handlingsplan for elvemusling (Miljødirektoratet)
 Overvåkingsprogrammet for elvemusling - Miljødirektoratet

Lirype

Ingress

Lirype er en karakterart i våre fjellområder. Negative påvirkningsfaktorer har i sum ført til at rypebestanden har avtatt sterkt de siste 20 åra. Som et resultat av dette er det i dag innført en rekke forskjellige restriksjoner på utøvelse av rypejakt.

Utbredelse og økologi

Sammen med sin nære slektning fjellrypa tilhører den skogshønsfamilien. Her finner vi også kjente arter som storfugl, orrfugl og jerpe. Lirype finnes i tilknytning til fjellbjørkeskogen og vierbeltet over hele landet. Den finnes også på større og mindre øyer langs kysten fra Midt-Norge og nordover. I likhet med de andre artene i skogshønsfamilien har rypene et stort reproduksjonspotensial; de legger mange egg og kan få fram mange kyllinger. Bestanden kan derfor i løpet av et par vellykkede sesonger med stor kyllingproduksjon øke betraktelig i størrelse. Men fordi det også er stor naturlig dødelighet i en rypebestand kan bestandene avta sterkt mellom år hvis produksjonen slår feil.

Bestandsstatus

Liryra er vårt fremste folkevilt og hver høst drar 50-90 000 nordmenn til fjells på rypejakt. Ikke bare vi mennesker setter pris på liryra som mat. Men også for arter som kongeørn og jaktfalk er li- og fjellryra av stor betydning, spesielt for en vellykket reproduksjon.

Fram til midt på 1980-tallet varierte rypebestandens størrelse med topp i bestanden hvert 3-4 år. Dette var hovedsakelig forårsaket av tilsvarende svingninger i smågnagerbestandene. En oppgang i smågnagerbestandene førte til redusert dødelighet forårsaket av smårovvilt som f.eks. rødrev, røyskatt og mår for ryer og rypebestanden økte. Når bestanden av smågnagere avtok, økte presset på ryer fra smårovvilt og rypebestanden avtok. Etter at disse regulære svingningene i smågnagerbestandene har uteblitt i større eller mindre grad har også oppgangsårene for rype i stor grad uteblitt. Dette, samt mange andre negative faktorer har i sum ført til at rypebestanden har avtatt sterkt de siste 20 åra. Som et resultat av dette er det i dag innført en rekke forskjellige restriksjoner på utøvelse av rypejakt.

Palsmyr (indirekte indikator):

Ingress

Palsmyr regnes som en truet naturtype, og en indikator på klimaendringer. Økende temperatur og mer nedbør gjør at permafrosten tiner, og at utbredelsen av de norske palsmyrene minker.

Hva er palsmyr?

Palser består av torvhauger med en kjerne av is, dannet som følge av permafrost. Disse haugene varierer i omfang fra under en meter til flere meters høyde. En palsmyr er en særegen myrvariant med veksling mellom slike palser og flate myrpartier.

Palsmyrer er svært dynamiske, med kontinuerlig nydannelse, vekst og nedbryting av palser. Denne mosaikken i palsmyrsystemene skaper mange velegnede hekkeplasser og stor variasjon i tilgangen på mat for arter med ulike krav, og bidrar til palsmyrenes rike fugleliv. I Norge finner vi palsmyrer i indre deler av Troms og Finnmark, samt i noe mindre utbredelse i Dovreregionen.

Trusler og påvirkningsfaktorer

Palsmyr regnes som en truet naturtype, pga. omfattende nedsmelting i løpet av de siste 100 år. Økende temperatur og mer nedbør gjør at permafrosten tiner og at utbredelsen av de norske palsmyrene minker. Palsmyr regnes som en truet naturtype, og en indikator på klimaendringer. Tining av palsmyrene vil også kunne ha negative effekter på bestandsutviklingen til flere av artene som er knyttet til naturtypen.

Årsakene til nedsmelting er trolig økte nedbørsmengder om sommeren, økte snødybder om vinteren (som isolerer og ikke slipper til kald luft), stedvis økte sommer- og vintertemperaturer, men også erosjon av eldre palser som er en normal utvikling. En annen økende trussel mot palsmyrene i nord er den sterkt økende trafikken fra motorisert ferdsel på barmark. Det antas at flere kontinentale myrarter er påvirket av de samme påvirkningsfaktorene som palsmyrer er og derfor viser tilsvarende trend som palsmyr. Eksempler på arter med potensielt samme trend som palsmyrer er lapptorvmose, lappstarr og finnmarksstarr. Dette er arter som ofte er observert ved palser.

Palsmyr som indikator

Indikatoren gir et uttrykk for utviklingstrender for velutviklede myrer i områder med sterk vinterkulde og arter som er sterkt knyttet til denne type myr under endrede klimaforhold.

Smyle (indirekte indikator):Ingress

Smyle er et vanlig gras i hele Norge. Arten har økt i mengde, trolig pga. økte avsetninger av langtransportert nitrogen. Økningen skjer imidlertid på bekostning av andre arter av planter og fører dermed til redusert plantemangfold.

Smyle som indikator

Smyle er et smalbladet gras som er vanlig i hele Norge i mange ulike skogtyper og i andre typer natur. Arten begunstiges av god nitrogentilgang.

Økte avsetninger av langtransportert nitrogen har blitt framsatt som en mulig forklaring på at smyle har økt i mengde i sørnorske og i sørsvenske skoger. Økning i smyledekning fører imidlertid gjerne til redusert plantemangfold, da andre arter blir skygget ut eller fysisk hindret i etablering og overlevelse. Det er denne negative effekten på biologisk mangfold som representeres her.

3.1.6 Indikator type

Choose correct indicator type from the drop-down menu.

Species or group of species
Indirect indicator

For indicators that represent the condition of single species, other formal taxa such as genera, or informal groups of species of the same type (e.g. rodents) choose Species or group of species. For all other indicators choose Indirect indicator.

Indirect indicators are typically community indices, surrogates like the MIS indicators standing and lying dead wood, and indicators based on habitat types.

Note that in cases where the indicator represents the negative effect of one species upon other types of organisms (e.g. through predation or competition), the indicators are considered to be Indirect indicators.

Note also that the Max scaling model (see below) is only relevant for Indirect indicators.

3.1.7 Type of organism (informal grouping)

(Only for [Species or group of species](#) indicators)

Choose correct group from the drop-down menu (see table). Note that these groups do not conform to modern, formal taxa. The groups are intended to characterize indicators for the public and for managers.

Next, choose correct subgroup from the drop-down menu (see table). As above, some of these groups do not conform to modern, formal taxa.

Types	
Group	Subgroup
Plant or algae	Algae Liverwort Moss Fern Seed plant
Fungus	Ascomycete Basidiomycete Lichen
Invertebrate	Cnidarian Crustacean Echinoderm Insect Mollusk Spider Sponge Other
Vertebrate	Amphibian Bird Bony fish Cartilaginous fish Mammal Reptile
Not relevant	Not relevant

3.1.8 Red list status 2006

(Only for [Species or group of species](#) indicators)

Choose correct status, as given in the Norwegian Red list from 2006 (Kålås et al. 2006), from the drop-down menu. Choose among the alternatives

<u>CR Critically endangered</u>
<u>EN Endangered</u>
<u>VU Vulnerable</u>
<u>NT Near Threatened</u>
<u>LC Least Concern</u>
<u>DD Data Deficient</u>
<u>NE Not Evaluated</u>
<u>NA Not Applicable</u>
<u>IA Not Relevant</u>

All alternatives, except IA Not Relevant, are formal red list categories.

Choose NE Not Evaluated for species that are not (yet) evaluated against the IUCN criteria. Choose NA Not Applicable for species that, according to the IUCN criteria, should not be evaluated for inclusion in the national red list for Norway.

Choose IA Not Relevant for indicators that represent groups of species.

3.1.9 Red list status 2010

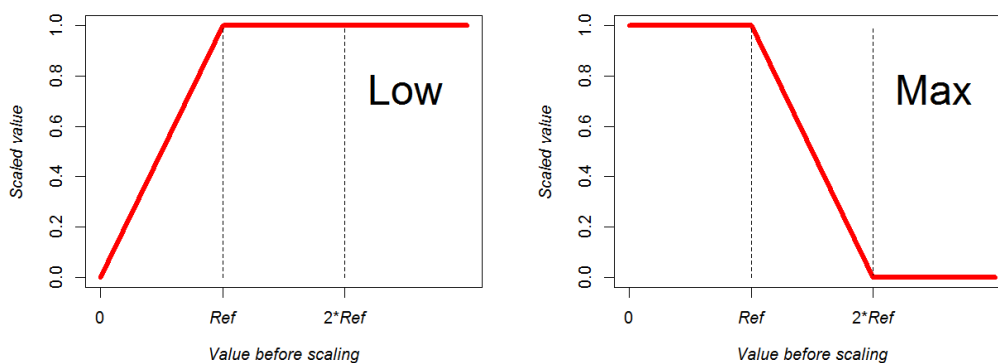
(Only for [Species or group of species](#) indicators)

Choose correct status, as given in the [Norwegian Red list from 2010](#) (Kålås et al. 2010), from the drop-down menu. See [Red list status 2006](#) above.

3.1.10 Scaling model

(Only for [Indirect indicators](#))

Choose correct scaling model for the indirect indicator from the drop-down menu.



The nature index framework includes two scaling functions: Low and Max (Pedersen & Nybø 2015). Choose the Low model when there is a positive relationship between the indirect indicator and the state of biodiversity. Choose the Max model when the relationship is negative.

Explanation:

The Nature Index is calculated as a weighted average of scaled indicator observations (Certain et al. 2011, Skarpaas et al. 2012). However, observations are recorded in the NI-database according to their appropriate, indicator specific scales. Thus, when calculating the nature index, observations must be transformed to a common scale before averaging. Both scaling functions transform indicator observations (values) to a scale ranging from 0 to 1 for all indicators (Certain & Skarpaas 2010, Certain et al. 2011).

Both types of scaling function contain one parameter, the reference value (Certain & Skarpaas 2010, Certain et al. 2011). Reference values are entered to the database on the Values page.

Species indicators are scaled by the Low model only (Pedersen & Nybø 2015).

3.1.11 Functional group

Choose the functional group that best characterizes the indicator from the alternatives in the drop-down menu.

Top predator generalist
Top predator specialist
Intermediate predator generalist
Intermediate predator specialist
Herbivore / Filter feeder
Primary producer generalist
Primary producer specialist
Detritivore / Decomposer
Not relevant

For indirect indicators that summarize the state of both specialists and generalists within the same trophic level, choose the “generalist” alternative for the trophic level in question.

Indirect indicators that summarize the state of organisms belonging to several trophic levels should be classified as key elements (see below). For such indicators choose Not relevant from the drop-down menu.

Explanation:

When the nature index is calculated as a weighted average, weights are assigned to observations according to the functional group indicators belong to, so that all functional groups documented in a municipality are given equal weight in the calculation (Certain & Skarpaas 2010, Certain et al. 2011). In effect, indicator observations belonging to a functional group with many indicators are down-weighted compared to those from a group with few indicators in the municipality.

3.1.12 Key element

This field cannot be edited by the user.

Explanation:

The criteria for regarding an indicator as a key element are: i) the indicator has statistical significance for populations of many other species, ii) it occurs over a large area, and iii) at the same

time, there is good data for it (Certain & Skarpaas 2010, Pedersen & Nybø 2015). Key elements are given extra weights in the calculation of the nature index. Key elements are in total assigned 50% weight within municipalities where they are present. The classification of indicators into key- or non-key elements is part of the ecological framework for the nature index and is not determined by the individual expert.

Key elements are also referred to as “extra-representative” indicators.

3.1.13 Reference value definition

The content of this field will appear on naturindeks.no.

Give a popular description (in Norwegian) of how [reference values for this indicator are determined](#) (cf. Nybø et al. 2015).

Examples:

Fjellrev

Referanseverdiene for fjellrev er beregnet ut i fra kunnskap om territoriørrelsen til denne arten. Fjellreven er sosial. Hun og han forsvaret et felles territorium, og regnes derfor som en enhet i beregningen av referanseverdien. Territoriørrelsen varierer markant med produktivitet og tilgang til byttedyr. Der det er stabil tilgang på byttedyr, som i et fuglefjell, kan territoriet være under 10 km². I høyfjellet er tilbudet av byttedyr atskillig mer marginalt og ustabil mellom år. Det er dokumentert territorier på 50-100 km². I beregningen av referanseverdien bruker vi kommunenes arealstatistikk, men tar hensyn til at territoriørrelsen øker med høyde over havet pga. minkende tilgang på byttedyr.

Rådyr

Referanseverdiene for rådyr beskriver en tenkt tilstand der rådyret har fått anledning til å kolonisere hele landet, jakt er fraværende, klimaet er som det var inntil nylig (1960-1990), skogbruk er av liten betydning for beiteproduksjon, og antallet rovdyr er begrenset av andre faktorer enn jakt (hovedsakelig begrenset av tilgangen på byttedyr). Høyt predasjonstrykk fra ulv, bjørn og gaupe i kombinasjon med strenge vintre, vil da medføre at rådyret er fraværende eller opptrer ved svært lave tettheter i snørike deler av landet, mens kystnære lavlandsområder, og særlig rovdyrfrie øyer, kan ha relativt høye tettheter av rådyr.

Smågnagere fjell

Referansetilstanden bygger på forestillingen om at et økosystem styrt av naturlige prosesser i et klima med minimal menneskelig påvirkning, skaper et mønster i smågnagerbestandenes dynamikk karakterisert ved regelmessige bestandstopper som er ca 5-10 ganger høyere enn bestandsnivået i år med lav bestand. Dette gjelder spesielt i nordlige økosystemer (fjell, boreal skog) med regelmessig snødekke av flere måneders varighet. I praksis er referansetilstanden en ekspertvurdering basert på antagelsen om at smågnagerdynamikken i perioden ca 1950-1980 var tilnærmet naturlig, siden observasjoner av smågnageres bestandsvariasjon fra denne perioden viser omtrent samme mønster som for naturlig bestandsdynamikk. Slik sett er referansetilstanden generelt lik tilstanden i 1950.

3.1.14 Reference value refers to a:

Choose either Seminatural habitat or Natural habitat.

The NI framework in Norway considers 9 “major ecosystems”: freshwater, mountain, ocean bottom, ocean pelagic, coast bottom, coast pelagic, wetland, forest, traditionally cultivated land (= open lowland). So far only indicators for “traditionally cultivated land” uses a semi-natural state as reference (see section “Spesielle forhold knyttet naturmark versus kulturmark” in linked document). (see also Nybø et al. 2015)

3.1.15 Indicator value explanation

The content of this field will appear on naturindeks.no.

Give a popular description (**in Norwegian**) of the data for this indicator. That is, what are the data sources, is the indicator part of a monitoring program, what is measured etc. Also describe the geographical resolution of the data entered into the NI database.

Examples

Smyle:

Datagrunnlaget er hentet fra seks overvåkingsområder i fjellbjørkeskog i det statlige overvåking-sprogrammet TOV (Program for terrestrisk naturovervåking). Områdene er lokalisert i Lund i Rogaland, Møsvatn i Telemark, Gutulia i Hedmark, Åmotsdalen i Sør-Trøndelag, Børgefjell i Nord-Trøndelag og Dividalen i Troms. Dataene gjenspeiler endringer i deknning av arten, basert på gjen-analyser av 50 stk. 1m² ruter innen hvert område hvert femte år, fra overvåkingsområdene ble etablert og frem til siste gjenanalyse.

Lirype

For å beregne rypebestandens størrelse har vi benyttet jaktstatistikk fra Statistisk sentralbyrå for lirype fra 1971/72 til d.d. I årene fram til 1990 har vi sagt at det var 10% avskyting av høstbestanden. På grunn av økt jaktpress og ny kunnskap har vi etter 1990 beregnet bestanden på grunnlag av 15% uttak for lirype. Men disse antagelsene er forbundet med usikkerhet. Vi har anslått at det korrekte uttaket fram til 1990 var mellom 5% og 15% av høstbestanden med 50% sannsynlighet. Tilsvarende grenser etter 1990 var hhv 10% og 20%.

Fordi bestandene av skogshøns kan variere svært mye fra år til år, har vi ikke benyttet jaktstatistikk kun for det enkelte år 1990, 2000 og 2010. Som beregningsgrunnlag for 1990 har vi benyttet gjen-nomsnittet for jaktseongene 1989/90-1991/92. Tilsvarende har vi brukt gjennomsnittet for jaktse-ongene og 1999/00-2001/02 og 2009/10-2011/2012 for å beregne bestandene i hhv 2000 og 2010. Alle data er oppgitt på fylkesnivå.

Fjellrev

For beregning av indikatoren har vi for 1950 bare kunnet angi antall fjellrevpar gjennom en konse-kvent ekspertvurdering. Denne vurderingen ble basert på potensialet for fjellrev i de ulike kommu-nene og vår kunnskap om dagens forekomst sett i relasjon til historiske kilder. Trolig er anslaget på 97 fjellrevpar i 1950 litt for høyt.

For 1990, 2000, 2010 er indikatoren basert på faktiske tall fra overvåkingsprogrammet på fjellrev. Data er hentet fra Rovbasen (www.rovbase.no). Etersom antall ynglinger stort sett alltid er null de årene det er lite smånagere, har vi valgt å legge inn antall fjellrevynglinger i det nærmeste toppåret som er registrert for kommunen innenfor tiåret (1981-1990, 1991-2000, 2001-2010). Nullestimer angitt etter dette tidspunktet betraktes derfor som reelle data og ikke bare som ekspertvurdering.

Nasjonalt overvåkingsprogram for fjellrev er finansiert av Direktoratet for naturforvaltning og rapporteres i Rovbasen (årlige rapporter foreligger fra og med 2003).

3.1.16 Expert notes

(Optional)

The content of this text field can only be read by users with access to the indicator. Here you may enter and store information about the indicator for your own convenience, i.e. description of methods to generate reference values, observations etc. which might be consulted later.

3.1.17 Save/update indicator

New or edited indicator metadata and choices from drop-down menus are not automatically stored in the nature index database. In order to store new or edited input, click the [Save/update indicator](#) button. If you forget to click the button your input will be lost when you leave the **Indicators** page.

Save/update indicator

3.2 Pressure factors

A table of pressure factors appears in the upper right corner of the **Indicators** page.

[Pressures explanation \(Norwegian\)](#)

Abbr.	Pressure factors	Value
BE	Harvesting and exploitation	<input type="text"/>
FR	Invasive species	<input type="text"/>
FO	Acidification	<input type="text"/>
EU	Eutrophication	<input type="text"/>
AF	Other pollution	<input type="text"/>
KL	Climate change	<input type="text"/>
AB	Land use / reduced habitat quality	<input type="text"/>
OP	Abandonment of traditional management	<input type="text"/>
FY	Habitat destruction incl. infrastructure	<input type="text"/>
FE	Disturbances by human activities	<input type="text"/>
AN	Other human pressures	<input type="text"/>
NN	Unknown or natural processes	<input type="text"/>
HY	Hydrological changes	<input type="text"/>

The list is a simplified version of the Norwegian standard for pressure factors (NS 9452:2012, Standard Norge 2012). Above the table is a link [Pressures explanation \(Norwegian\)](#) to a document in Norwegian that explains the different categories included here.

In the table there is a drop down list for each factor containing alternatives for describing the magnitude of the negative effect of the pressure factor on the indicator.

Very small
Small
Moderate
Strong
Very Strong
Not relevant/unknown

In the table choose up to the three most influential factors potentially affecting the indicator in the given ecosystem(s) in a negative way in Norway. The magnitude of the effect of a pressure factor may vary across the country or the ocean, but here indicate pressure factors that have a certain geographical range of influence (e.g. not affecting only a small part of a municipality or a fjord).

For each of these factors characterize the effect by choosing the appropriate category from the drop-down list. For the remaining pressure factors choose the Not relevant/unknown alternative.

3.2.1 Save/update pressures

Your choices from the drop-down lists for pressure factors are not automatically stored in the nature index database. In order to store new input, click Save/update pressures.

3.3 Ecosystem affinity

ID	Ecosystem name	% value
1	Freshwater	<input type="text"/>
2	Mountain	<input type="text"/>
3	Ocean bottom	<input type="text"/>
4	Ocean pelagic	<input type="text"/>
5	Coast bottom	<input type="text"/>
6	Coast pelagic	<input type="text"/>
7	Wetland	<input type="text"/>
8	Forest	100
9	Traditionally cultivated land	<input type="text"/>

[Save/update ecosystems](#)

The NI framework in Norway considers 9 “major ecosystems”: freshwater, mountain, ocean bottom, ocean pelagic, coast bottom, coast pelagic, forest, wetlands, and traditionally cultivated land (= open lowland). Data collected for each indicator provide information on one or several of these major ecosystems, in different proportions. For example data collected for the Willow ptarmigan are affected by the conditions in both forest- and mountain ecosystems.

The Ecosystem affinity field is used to document these proportions, using percentages between 0 and 100. For example, an indicator such as benthic macro-fauna which depends exclusively on Freshwater gets a basic weight of 100 in Freshwater and 0 in the other major ecosystems. On the other hand, the Willow ptarmigan, which exploits low alpine habitats more than forest gets a weight of 70 in mountain and 30 in forest.

Note, what is relevant to consider here is how the major ecosystems states are reflected in the data collected for the indicator. For example, in cases where the data collected are affected by the state of only one major ecosystem, say data for a plant species collected in forests, even though the indicator occurs in several other systems, say mountain and cultivated land, Forest should be given the basic weight of 100.

These numbers are relative estimates, and it is up to each expert to define them for their indicators. Their sum must always equate 100.

Indicators are weighted according to these proportions in the calculation of the Nature Index for a major ecosystem (Certain & Skarpaas 2010).

3.3.1 Save/update ecosystems

New or edited ecosystem affinities are not automatically stored in the nature index database. In order to store new input, click [Save/update ecosystems](#).

3.4 Documentation pop up window

Click the Documentation link on the **Indicators** page to enter the **Documentation** pop-up window.

Documentation

In the documentation window you may establish and store links to documentation for your indicator that is public and accessible on the web, or upload such documentation into the database. Such documentation includes scientific publications and reports, fact sheets, and other popular descriptions of species. You may also upload and store a picture of the indicator.

On this page you may also remove uploaded documents and pictures, and you may edit or remove established links.

The aim with storing uploaded and linked documentation in the database is to make the documents accessible for the public on naturindeks.no. The collection of documents should preferably give the interested reader insight into the most important management issues concerning the indicator, monitoring programs that collect data on the state of the indicator, the biology/ecology of the indicator.

To reduce the need for repeated updating stored links, they should refer to “stable” web-addresses, which you expect will be maintained in foreseeable future.

The uploaded picture will also be shown on naturindeks.no. The photographer or other copyright holder must give his/her permission for such use before the picture is uploaded to the database. There is no guarantee against that uploaded pictures might be copied and spread on the internet when they are displayed on naturindeks.no. If desired one could add the name of the photographer together with a copyright symbol as a watermark on the photo before uploading it to the database. Pictures should preferably be square shaped with a size of about 1000 x 1000 pixels.

3.4.1 Content

The pop-up window contains a table over linked and uploaded documents for the current indicator, where the last row is for entering a new link or document.

It also contains a field for entering the path and name of a file to be uploaded together with a **Browse** button / function for finding the file in question and automatic input of path and file-name, and an **Upload** button for uploading the file to the database.

ID	Text	Url	Result link	Public picture	Photo by		
1218	Natur i endring, Terrestrisk	http://www.nina.no/archive/n	Natur i endring, Terrestrisk naturovervåking i 2010	<input type="checkbox"/>		Update	Delete
1221	Natur i endring, Terrestrisk n	http://www.nina.no/archive/n	Natur i endring, Terrestrisk naturovervåking i 2008	<input type="checkbox"/>		Update	Delete
1222	Natur i endring, Terrestrisk n	http://www.nina.no/archive/n	Natur i endring, Terrestrisk naturovervåking i 2007	<input type="checkbox"/>		Update	Delete
1223	Terrestrisk naturovervåking i	http://www.nina.no/archive/n	Terrestrisk naturovervåking i 2011 : Markvegetasjon, epifytter, smågnagere og fugl	<input type="checkbox"/>		Update	Delete
1224	Program for miljøovervåking	http://www.nina.no/archive/n	Program for miljøovervåking Tjeldbergodden	<input type="checkbox"/>		Update	Delete
1252	Alge på bjerk_Signe Nybo.JPG	http://www.nina.no/archive/n	Alge på bjerk_Signe Nybo.JPG	<input checked="" type="checkbox"/>	© Signe Nybo	Update	Delete
NY				<input type="checkbox"/>		Add new	

Select a File to Upload

The table has eight columns; **ID**, **Text**, **Url** and **Result link**, **Public picture**, **Photo by** as well as two columns with **Update** and **Delete** buttons for all documents and links. Last row contains an **Add new** button only.

The ID is automatically allocated to the document by the database system.

Result link is also automatically generated from the content in Text and Url. It contains the actual link and shows how the link to the web page or uploaded document will appear on naturindeks.no.

The Url column is for storing web-addresses to linked documents while the Public picture and Photo by columns are used to store information related to those pictures that will appear on naturindeks.no.

3.4.2 Upload a new document/file

Click the Browse button which gives you access to the folders on your computer.

Find and open the file in question.

Click the Upload button to upload the file.

The last row of the table will then be updated with a new, unique ID for the document, an empty Url and the resulting link. You may test the link by clicking it. In addition a new empty last row will be generated in the table for uploading additional documents or creating new links to web-pages.

3.4.3 Edit the text for an uploaded document/file

Find the row in the table with the document in question.

Enter new text in the document's Text field.

Click the Update button in the same row.

This will cause the document's Result link to be updated without changing the document ID.

3.4.4 Establish a link to a web page

Enter web page title, name, or text that describes the content of the page in the empty Text field in the last row of the document table.

Enter correct address to the web page in the empty Url field in the same row.

Click the Add new button in the same row.

The row will then be updated with a new, unique ID for the link and the resulting link. You may test the link by clicking it. In addition a new empty last row will be generated in the table for uploading a new document or creating additional links to web-pages.

3.4.5 Edit the link to a web page

Find the row in the table with the link in question.

Enter new text in the Text field and/or enter new address in the Url field.

Click the Update button in the same row.

This will cause the document's Result link to be updated without changing the ID.

3.4.6 Upload a picture to be displayed on naturindex.no

The Uploaded picture will be displayed on naturindeks.no. The photographer or other copyright holder must give his/her permission for such use before the picture is uploaded to the database. If desired one could add the name of the photographer together with a copyright symbol as a watermark on the photo before uploading it to the database.

Pictures should preferably be square shaped with a size of about 1000 x 1000 pixels. Click the Browse button which gives you access to the folders on your computer.

Find and open the picture file in question.

Click the Upload button to upload the file.

The last row of the table will then be updated with a new, unique ID for the picture, an empty Url and the resulting link. In addition a new empty last row will be generated in the table for uploading additional documents or creating new links to web-pages.

Mark the picture to be displayed on naturindeks.no by tagging the Public picture box in the same row. Only tag one uploaded picture for each indicator.

Enter the photographers name in the Photo by field. Add a copyright symbol if both desired and appropriate.

3.4.7 Edit an uploaded picture

Find the row in the table with the picture in question.

Correct the content of the Text, Public picture, and/or Photo by fields in that row.

Click the Update button in the same row.

This will cause the document's Result link and other information to be updated without changing the picture ID.

3.4.8 Remove an uploaded document/file or picture from the database

Find the row in the table with the document in question.

Click the Delete button in the same row.

This will remove the row from the table and remove the file from the database.

3.4.9 Remove a link from the database

Find the row in the table with the link in question.

Click the Delete button in the same row.

This will remove the row from the table and remove the link from the database.

4 Areas page

On the **Areas** page you delineate the spatial units (here called areas) from where indicator data is collected.

When a new indicator is included in the nature index database, this page must be visited before entering information. It can also be visited later on, to update areas for existing indicators, for example if knowledge becomes available in new areas.

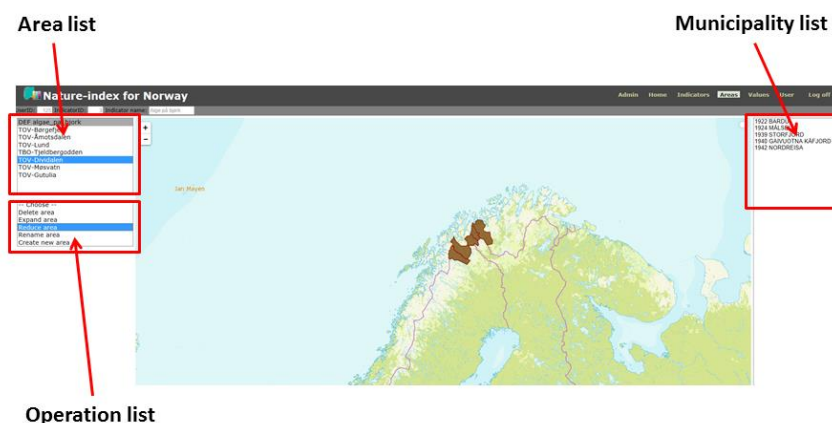
Two kinds of geographical units are defined in the **Areas** page: the definition area, and the areas with data. The definition area is the total geographical range where the indicator is relevant. Within the definition area, one or several areas can be delineated. Each such area is a single statistical unit, in which you can enter values for the indicator. The areas correspond to the spatial scale at which information is entered in the database. Definition areas and areas are indicator specific and must be delineated for each indicator separately, even for indicators observed in identical sets of spatial units. The finest achievable spatial scale for entering information is the municipality for terrestrial and coastal regions, and specifically designed regions for the oceans (Skagerak, Nordsjøen, Norskehavet, Barentshavet). They constitute the basic elements of the definition area and areas.

To access the page choose one of your indicators on the Indicator page. Then click the **Areas** tab.

4.1 Content

The content of the **Areas** page will differ whether some spatial units are already defined for your indicator or not and depending on the operation you perform. Normally it contains two drop-down lists on the left, an area list and a list of possible operations – the operation list. The operation list contains functions for creating, renaming, and deleting areas, as well as functions for expanding and reducing areas defined earlier.

The central part shows a map, which, depending on context, displays delineated areas and/or municipalities/oceanic regions available to be included in a (new) spatial unit. On the right is a list of available municipalities/oceanic regions - the municipality list. When you enter the page the map will show the indicator's Definition area, while the municipality list is empty.



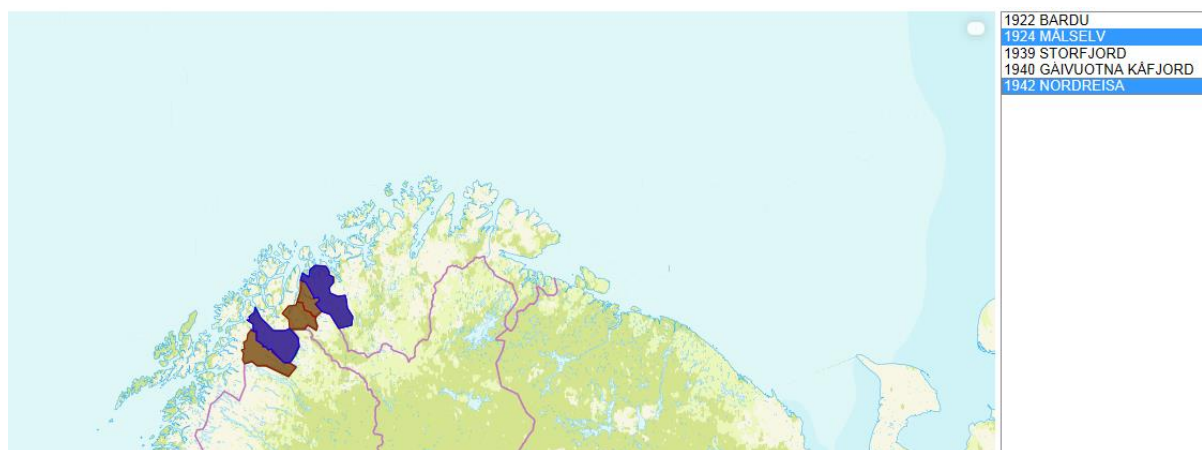
4.2 Selecting municipalities / oceans from the map

Areas may be delineated by selecting municipalities and/or oceanic regions from the map. You do this by sequentially clicking on municipalities to be included in the area. The name of the municipality under the pointer will appear in the upper right corner of the map. The name is constantly updated as you move the pointer.

Scroll the mouse wheel or click the buttons in the upper left corner to zoom in and out of the map. Press the left mouse button and drag the map in order to navigate in different map sections.

4.3 Selecting municipalities / oceans from the municipality list

Alternatively, areas can be delineated by selecting municipalities and/or oceanic regions from the municipality list. You do this by sequentially clicking the names of the municipalities to be included in the area while pressing the Ctrl-key. Press the Shift-key if you want to select municipalities that are listed sequentially.



4.4 Definition area

In order to start defining spatial units for your indicator, you first need to delineate the so called Definition area for your indicator, which is the total geographical range the indicator potentially may cover. This area may be considerably larger than the area your data covers. The definition area is important for evaluation “lack of knowledge”.

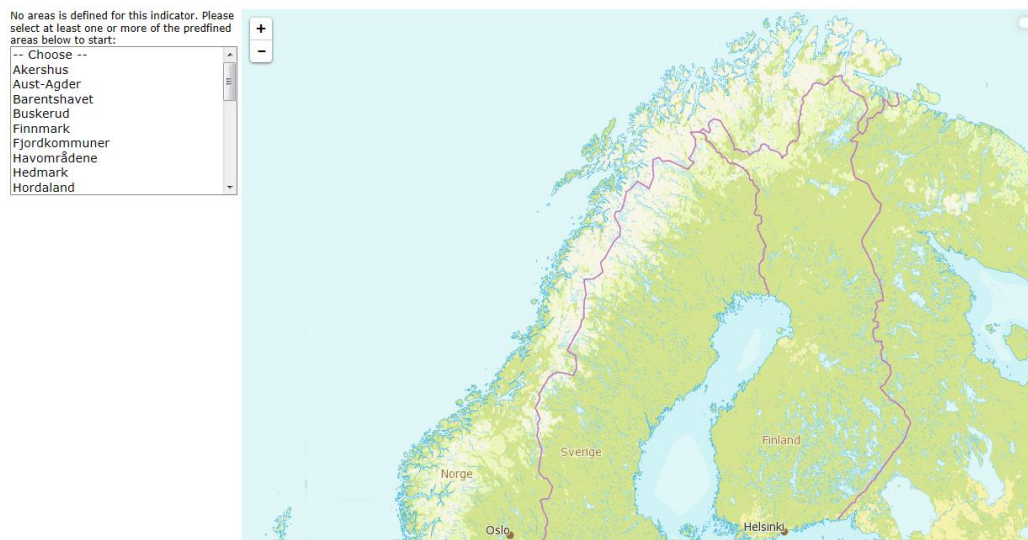
DEF bananslørsopp

After delimiting the definition area, the actual areas from which you have measurements are defined within the definition area.

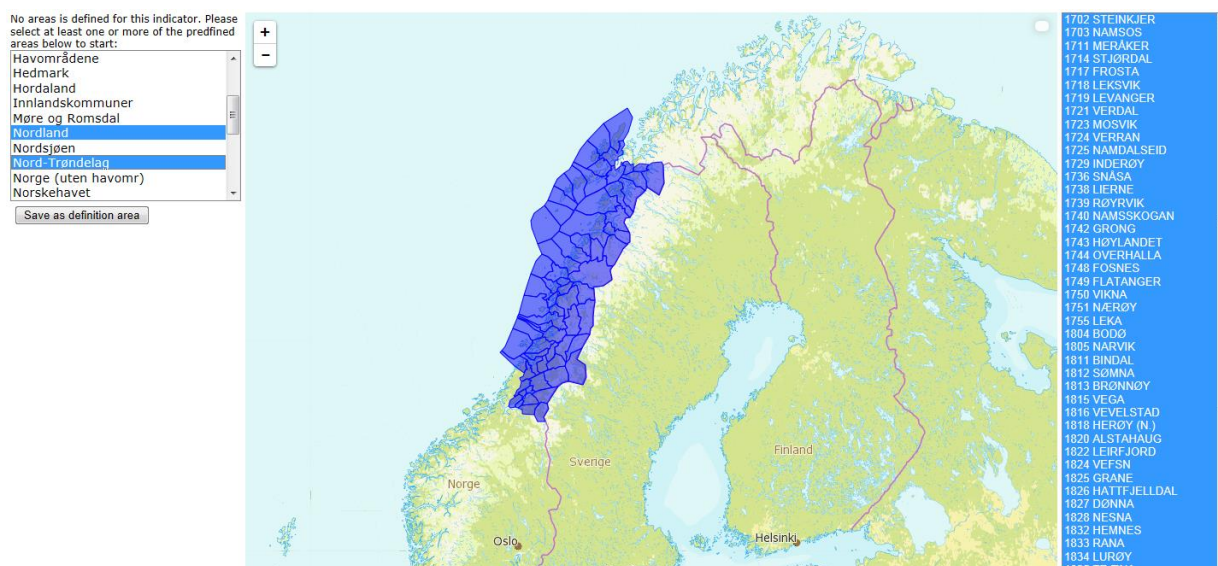
You will not be able to delineate areas outside the Definition area. However, the Definition area may be expanded (or reduced) if necessary.

4.5 Delineate the definition area for the first time

Before a Definition area is delineated for you indicator, the map and municipality list is empty, while on the left there is one drop-down list of predefined areas you may choose for you indicator.



Choose the predefined area from the list that best corresponds to the indicator's definition area. If you want to merge some of the predefined areas, press the Ctrl-key while choosing additional areas in the list. The resulting definition area is then displayed on the map and the municipality list will contain all municipalities in the definition area.



Optionally you may remove some municipalities from the candidate definition area before saving either by clicking on those municipalities in the map or by clicking on their names in the municipality list while pressing the Ctrl-key. (If you want to add single municipalities you may proceed by first saving the candidate definition area and thereafter expand it as described below.)

Click the Save as definition area button.

In the pop-up window rename the definition area if desired.

Click Accept.

After saving the operation list appears on the left side of the map.

4.6 Create a new area (within the Definition area)

Choose Create new area in the operation list.

Available municipalities (i.e. municipalities within the Definition area that is not included in another area in the area list) are then displayed on the map and listed on the right.

Select municipalities to be included in the new area from the map or from the municipality list.

Click the Save area button.

In the pop-up window rename the area if desired.

Click Accept.

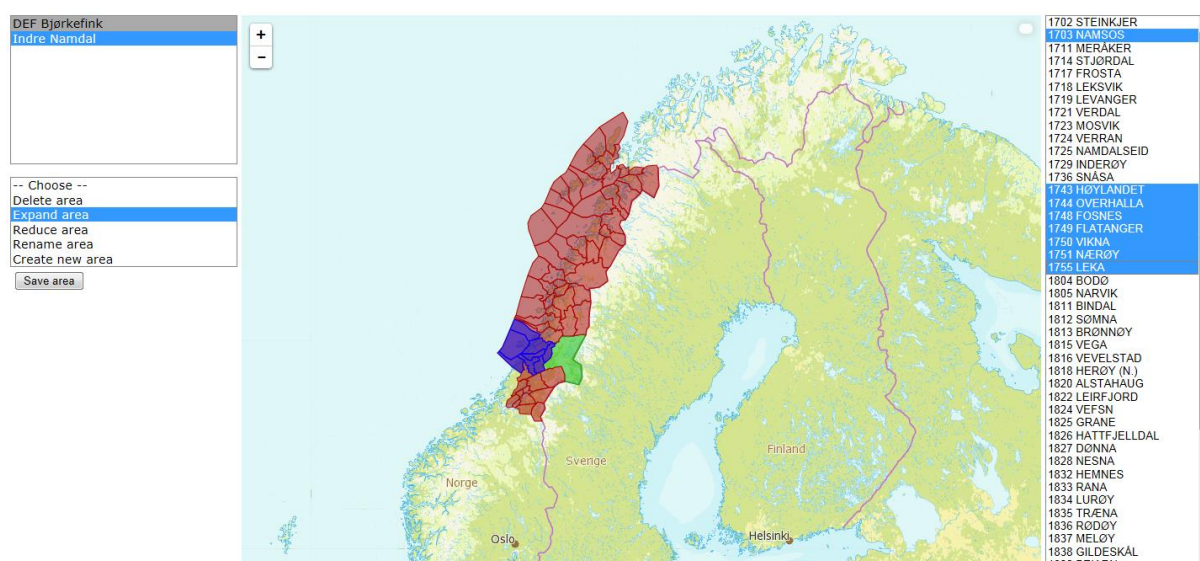
4.7 Expand an area, expand the definition area

Choose the area to be expanded from the area list.

Choose Expand area in the operation list.

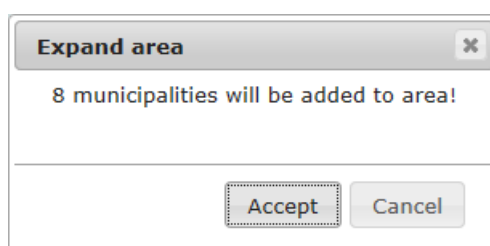
Available municipalities (i.e. municipalities within the definition area that is not included in another area in the area list) are then displayed on the map and listed on the right. (If you expand the definition area all oceanic regions/municipalities outside the definition area are displayed and listed.)

Select municipalities to be included in the expanded area from the map or from the municipality list.



Click the Save area button.

Click Accept in the pop-up window.



Indicator data that are already stored for this area will automatically be linked to all municipalities in the expanded area.

4.8 Reduce an area, reduce the definition area.

Choose the area to be reduced from the area list.

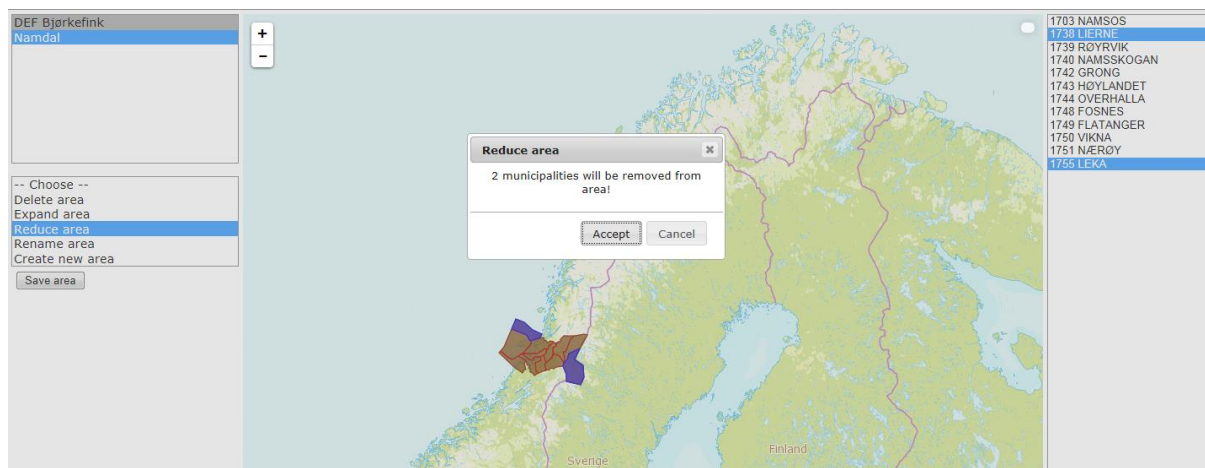
Choose Reduce area in the operation list.

Municipalities included in the area are then displayed on the map and listed on the right.

(You can reduce the definition area only when it contains municipalities that are not allocated to areas with data (cf. 4.6). Only municipalities not allocated to such areas can be removed from the definition area.)

Select municipalities to be removed from the map or from the [municipality list](#).

Click the [Save area](#) button.



Click [Accept](#) in the pop-up window.

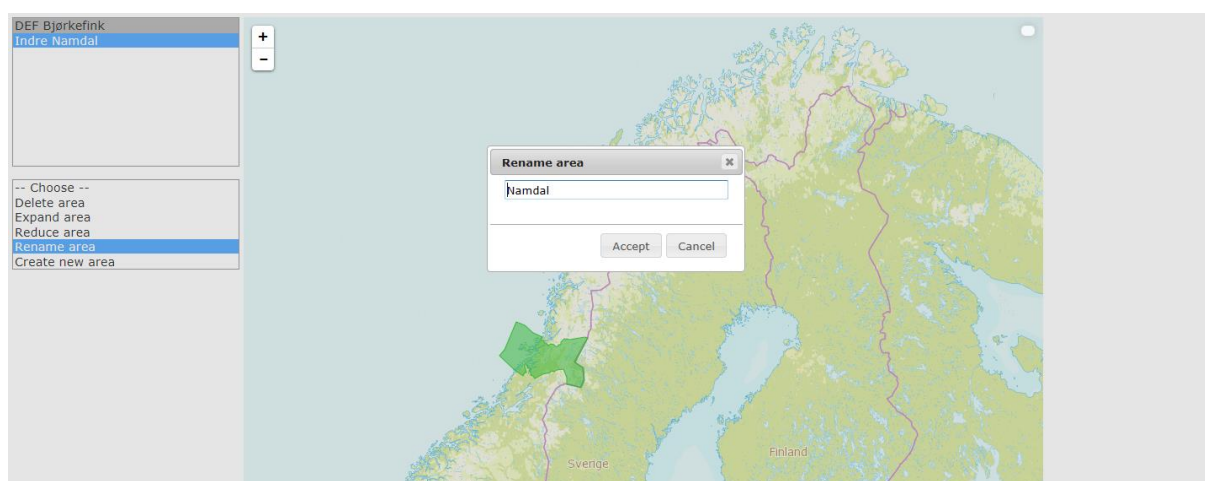
Indicator data that are already stored for this [area](#) will no longer be linked to removed municipalities.

4.9 Rename an area

Choose the [area](#) to be renamed from the [area list](#).

Choose [Rename area](#) in the [operation list](#).

Edit the name in the pop-up window.



Click [Accept](#).

4.10 Delete an area

Choose the area to be deleted from the area list.

Choose Delete area in the operation list.



Click Accept in the pop-up window.

Warning! Deleting an area causes all observation data from this area to be deleted from the database.

Warning! Deleting the definition area causes all areas and observation data for the indicator to be deleted from the database.

4.11 Merge two areas

You may want to merge two areas if you want data for “area 1” to be valid also for “area 2”.

Delete “area 2” (see above).

Expand “area 1” with municipalities previously in “area 2” (see above).

This causes old data for “area 2” to be deleted from the database, while data for “area 1” now also are linked to municipalities formerly in “area2”.

4.12 Split one area into two

You may want to split one area into two if you have new data that only applies to parts of a formerly delineated area.

Reduce the former area by removing municipalities that have new data.

Create a new area by selecting those municipalities you removed.

5 Values page

To access the page choose one of your indicators on the [Indicator](#) page. Then click the **Values** tab. When entering the page you may also consult the [appendix](#) of this manual to learn how the data entered on this page is further processed before they are included in the calculation of the nature index.

5.1 Content

Values page contains tools for entering indicator [values](#) to the database either directly on the page or by [importing the data from Excel work-sheets](#). There is also a [proofreading tool](#) that visualizes stored data on a map.

The left side of the page contains a list of delineated [areas](#) for the chosen indicator, the drop-down list for selecting observation year to be visualized, and the tool for importing data. The rest of the page contains a map for visualization.

When you select an [area](#) in the [area list](#) an additional [data table](#) for displaying, entering, and editing the numeric data for this [area](#) will appear below the list. The table consists of five columns; Time, [Value](#), [Lower](#), [Upper](#), [Datatype](#), one row for [reference values](#) and one row for each observation year. Below the table is a text field that contains the measurement unit used to scale the numeric values in the table.

The screenshot displays the 'Values' page interface. On the left, the 'Area list' section contains a dropdown menu for selecting an area, a table for entering data, and a 'Download/Upload' section. The 'Data table' section is a table with columns for Time, Value, Lower, Upper, and Datatype. The 'Download/Upload' section includes a 'Download area file with area and values for this indicator' link, a 'Select a xml file to Upload' text field, and an 'Upload file' button. On the right, the 'Visualization tool' is a map of the region, showing a green shaded area. Red arrows point from the labels to the corresponding elements in the interface.

Area list

Data table

Time	Value	Lower	Upper	Datatype
Reference	0.6	0.40	0.75	Expert judgement
1990	0.7	0.4	0.8	Expert judgement
1995	0.87	0.48	0.96	Expert judgement
2000	0.504	0.453	0.548	Expert judgement
2010	0.932	0.817	0.941	Expert judgement
2011	-1	-1	-1	Expert judgement
2012				Not chosen
2013				Not chosen

Unit of measurement
Fangst_per_arnet_mnsats_(dig_arnal_kvok)*1000/100

Tool for data import from Excel

Visualization tool

5.2 Enter or edit indicator measurements directly on the Values page

Choose area for which you will enter values from the area list.

The area is shown on the map and the data table appears below the area list. Data already stored in the data base for this area are displayed in the table. Table elements where no data have been entered and stored earlier appear empty.

Select area for data input

- Def.omraade 21
- HALDEN
- SARPSBORG
- MOSS
- FREDRIKSTAD
- HVALER
- RÅDE
- RYGGE
- VESTBY**
- FROGN

Time	Value	Lower	Upper	Datatype
Reference	3,37831	2,963875	3,792745	Model output
1950	4	4	4	Expert judgement
1990	-1	-1	-1	Monitoring data
2000	3,994954E	3,634620E	4,3552884	Monitoring data
2010	-1	-1	-1	Monitoring data
2011	-1	-1	-1	Monitoring data
2012	-1	-1	-1	Monitoring data
2013				-- Not chosen --

Unit of measurement

Shannon-Wiener_diversitetsindeks_H'_(log2)

Enter or edit numeric values in the table. I.e. for new reference values and all years with new data, provide expected values as well as lower and upper quartiles and choose data type from drop-down list.

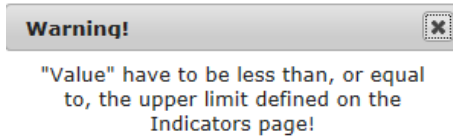
Enter -1 (missing value) in the Value cell if the indicator is not measured in the area for a particular year. You may leave Lower and Upper empty in this case. After saving values these two cells will remain empty regardless of whether data have been entered there or not.

Control that the same unit of measurement is used to scale all numeric fields in the table, i.e. reference values and values as well as expected values and quartiles.

Enter (if not entered earlier) or edit (if not correct) unit of measurement in the text field below the table.

Click the Save values button in order to save new or edited data in the database. If you forget to click the button new or edited data will be lost when you leave the Values page or choose another area from the area-list.

If you have provided [limits for indicator values](#) on the [Indicators](#) page, your input will be checked against these before values are stored. If some values are outside these limits, new or edited data will not be stored. Instead a warning message is displayed.



5.3 Import data from Excel

Click the [Download excel file with areas and values for this indicator](#) link.

Download/Upload

[Download excel file with areas and values for this indicator](#)

Select a xml file to Upload

Choose Open or one of the alternatives from the Save menu in the pop up window.



This creates an xml-file that you open in Excel. The file has 11 columns with data (Area ID and name, Indicator ID and name, Time ID and name (text), [Expected value](#), [Lower and Upper Quartiles](#), [Data type](#) and unit of measurement). The file has for each area one row for its reference value and one row for each year. One example is shown below where there are two areas defined for the indicator. The Datatype column uses codes for the different data types, 1 stands for [Expert judgment](#), 2 for [Monitoring data](#) and 3 for [Model output](#).

	A	B	C	D	E	F	G	H	I	J	K
	Area ID	Area Name	Indicator ID	Indicator Name	Time ID	Time Text	Value	Lower	Upper	Datatype	Unit of measuremer
2	1456	NORSKEHAVET	16	Blåkveite	0	Reference	25	25	25	1	Relativ gytebiomass
3	1456	NORSKEHAVET	16	Blåkveite	1	1950	25	19	31	1	Relativ gytebiomass
4	1456	NORSKEHAVET	16	Blåkveite	2	1990	7	5	9	3	Relativ gytebiomass
5	1456	NORSKEHAVET	16	Blåkveite	3	2000	8	6	10	3	Relativ gytebiomass
6	1456	NORSKEHAVET	16	Blåkveite	4	2010	13	19	31	1	Relativ gytebiomass
7	1456	NORSKEHAVET	16	Blåkveite	5	2011	19	13	31	1	Relativ gytebiomass
8	1456	NORSKEHAVET	16	Blåkveite	6	2012	21	14	32	1	Relativ gytebiomass
9	1456	NORSKEHAVET	16	Blåkveite	7	2013					Relativ gytebiomass
10	1457	BARENTSHAVET	16	Blåkveite	0	Reference	450	450	450	1	1000 tonn per kvadr
11	1457	BARENTSHAVET	16	Blåkveite	1	1950	-1	-1	-1	1	1000 tonn per kvadr
12	1457	BARENTSHAVET	16	Blåkveite	2	1990	84,5	82,1	89,4	3	1000 tonn per kvadr
13	1457	BARENTSHAVET	16	Blåkveite	3	2000	95,8	92,5	102,4	3	1000 tonn per kvadr
14	1457	BARENTSHAVET	16	Blåkveite	4	2010	244,5	222,9	287,8	3	1000 tonn per kvadr
15	1457	BARENTSHAVET	16	Blåkveite	5	2011	208,8	169,3	287,8	3	1000 tonn per kvadr
16	1457	BARENTSHAVET	16	Blåkveite	6	2012	230,9	198,4	296	3	1000 tonn per kvadr
17	1457	BARENTSHAVET	16	Blåkveite	7	2013					1000 tonn per kvadr

Enter new data in the empty cells and/or edit old data. **Do not perform any operation that will change the format or structure of the spread-sheet or the format of the cells.** This will disrupt the routine for importing the data back into the nature index database and most likely cause it to fail or malfunction.

Close the xml-file.

Make sure you save a copy of the file for later reference and possible corrections.

In the **Values** page click the [Browse](#) button that gives you access to the folders on your computer.

Find and open the xml-file in question.

Click the [Upload file](#) button in the **Values** page to upload the file and store new and edited data in the database.

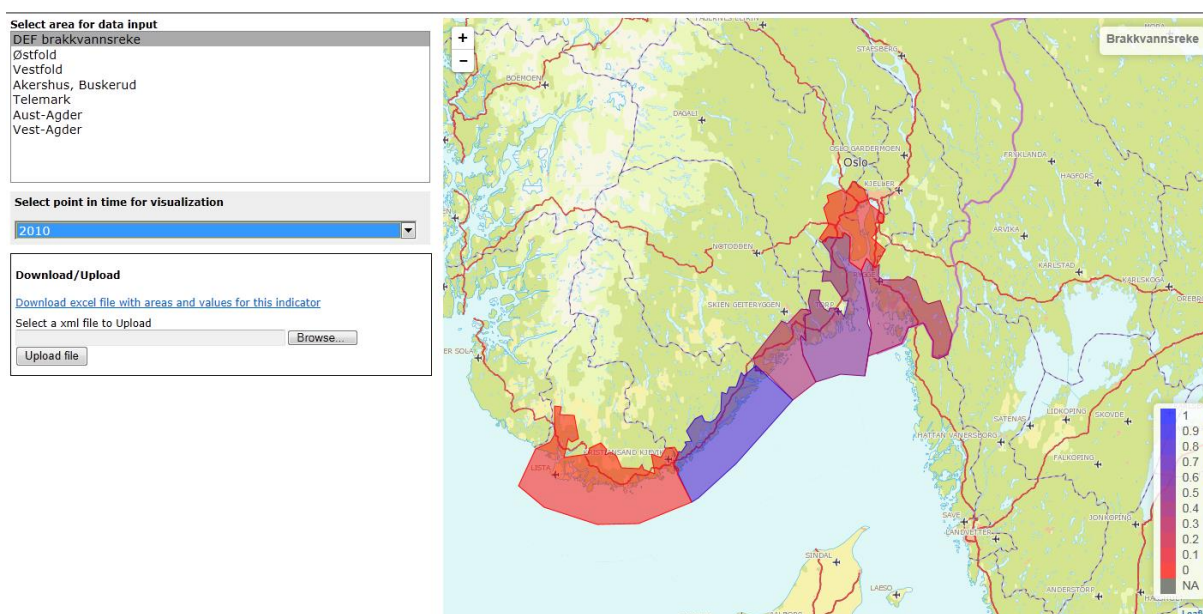
5.4 Visualize stored data

Select a year from the drop-down list [Select point in time for visualization](#).

Select point in time for visualization

2010

[Scaled indicator values](#) for all [areas](#) that year will then be displayed on the map according to the color code shown in the lower right corner.



Further, if you point at one of the [areas](#) on the map, the name of the [area](#) will appear in the upper right corner of the map together with the reference value as well as the scaled expected value. The content is constantly updated as you move the pointer to new areas.

5.5 Reference values

Reference values and how to determine them is explained in a [separate document](#). (see also Nybø et al. 2015)

5.6 Values

Indicator values are measured/observed with uncertainty. Such uncertainty may arise for a number of reasons. For example because indicator values are calculated from a sample of observations, because of measurements errors, because model generated values are from models where parameters are estimated with error, because expert judgments are uncertain etc.

Values are therefore represented by probability distributions in the nature index framework, where the location of the distribution represents the value's magnitude and uncertainty is represented by the dispersion of the distribution (Certain et al. 2011). The framework uses [expected value](#) as location parameter and [interquartile range](#) as dispersion measure.

The generation of such a distribution is a two-step process. In the first step experts provide estimates of expected values and lower and upper quartiles on the **Values** page. These are stored in the database. In step two these are replaced by a probability distribution. For continuous indicators this is the distribution, chosen among normal-, truncated normal-, lognormal-, Weibull-, Gumbell- and gamma distributions that best fits the parameters provided by the experts. For discrete distributions, the set of candidate distributions spans Poisson-, negative binomial-, and zero-inflated Poisson distributions (Johnson et al. 1994).

Consult the [appendix](#) of this manual to preview the shape and dispersion of the distribution that results from a set of candidate parameter values using this procedure.

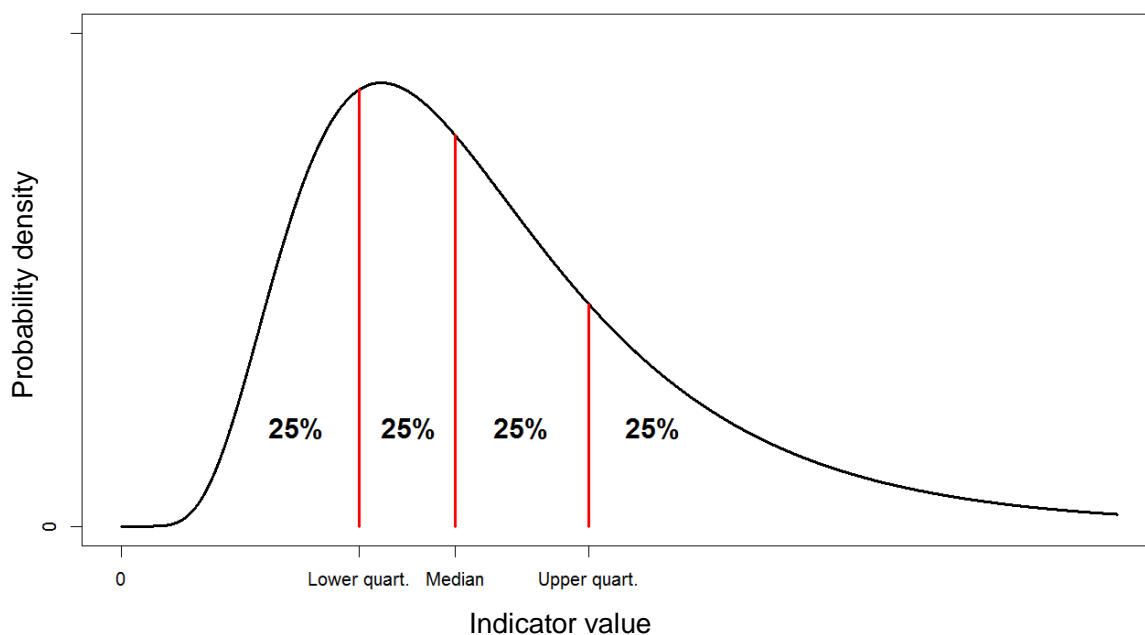
5.7 Expected value

The expected value is the "average value" of a probability distribution. More formally, it is the average of an infinite sample of random draws from the distribution. Informally, in the present context, one may think of the expected value as the "best estimate" for the "true" indicator value. Expected value should be entered in the [Value](#) column of the [data table](#).

5.8 Quartiles

The quartiles of a probability distribution are the set of three numbers that partition the domain of possible indicator values into four equally probable intervals.

The lower and higher quartiles define the range that would contain half of the values obtained if repeated sampling was carried out. To put it simply, there is a 50% chance that the "true" indicator value lies within this range. Note however, that there both is a 25% chance that the "true" value is smaller than the lower quartile and a 25% chance that it is larger than the upper quartile. The distance between the upper and lower quartiles is called the Inter-quartile range. Inter-quartile range is one of several statistics that measures the dispersion of a probability distribution. It should not be confused with confidence intervals that are usually much broader (the range of confidence intervals usually spans 95% of the possible values).



The upper quartile should be entered in the [Upper](#) column of the [data table](#), the lower quartile in the [Lower](#) column. The middle quartile, most often called the median, is not used in the current framework.

5.9 Unit of measurement

The same unit of measurement must be used for all numeric values referring to the same area, i.e. [reference values](#) and [values](#) as well as their [expected values](#) and [quartiles](#).

However, unit of measurement may vary among [areas](#) defined for the same indicator.

5.10 Data type

This field is used to characterize the information source from which values are entered. There are three types recognized in the nature index framework (Certain et al. 2011):

Expert judgment
Monitoring data
Model output

6 References

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7 Appendix – Examples of probability distributions fitted to indicator observations by elicitation

This appendix gives examples of how the elicitation procedure (Garthwaite et al. 2005) adopted in the methodological framework for calculating the nature index works. In the nature index framework indicator observations are given as estimates of three distributional parameters provided by the experts, the lower- (\hat{q}_1) and upper quartiles (\hat{q}_3) together with the mean ($\hat{\mu}$, expected value).

7.1 The elicitation method

When constructing the nature index framework it was stressed, that the framework should account for uncertainties in indicator observations (Certain et al. 2011, Skarpaas et al. 2012). Such uncertainty may arise for a number of reasons, e.g. because indicator values are calculated from a sample of observations, because of measurement errors, because model generated observations are from models where parameters are estimated with error, because expert judgments are uncertain etc. Indicator observations are therefore represented by probability distributions in the nature index framework, where the location of the distribution represents the value's magnitude and uncertainty is represented by the dispersion of the distribution. The framework uses expected value as location parameter and interquartile range as dispersion measure.

The generation of such a distribution is a two-step process. In the first step experts provide estimates of the distribution's expected value and lower and upper quartiles. In step two these are replaced by a probability distribution. This is the distribution, among a specified set of two-parameter model distributions, which best fits the parameter estimates provided by the experts, according to the least square principle. For continuous indicators this set of model distributions consist of truncated normal-, log-normal-, Weibull-, zero-inflated exponential (ZIE)- and gamma distributions. This process is an example of elicitation. The ZIE-distribution is an example of a mixed distribution that combines a point probability at zero with a continuous, exponential distribution for the other possible indicator values.

This appendix deals with continuous indicators only.

The examples, which follow on the next pages, should be consulted to preview the shape and dispersion of the distribution that results from a set of candidate parameter values provided by the experts.

7.2 Explanation of Figures

The example distributions are for standardized observations where the original observation is divided with the reference value (*ref*). Distribution of unscaled "observations" are obtained by multiplying the quantiles with the reference value and dividing the densities with the reference value.

Fig A1 gives examples of distributions that result from the elicitation process when the estimated input mean is the average of ("in the middle of") the two quartiles.

Fig A2 gives examples of distributions that result when the estimated input mean is larger than the average of the two quartiles.

Fig A3 gives examples of distributions that result when the estimated input mean is less than the average of the two quartiles.

Fig A4 gives examples of distributions that result when the estimated input mean is close to zero and at the same time is equal to the average of the two quartiles.

Fig A5 gives examples of distributions that result when the estimated input mean is close to zero and not equal to the average of the two quartiles.

Fig A6 gives examples of distributions that result when one or both of the estimated input quartiles are zero.

Fig A7 gives examples of distributions that result when all three input parameters are set equal to each other.

Blue lines mark the expert estimate of mean ($\hat{\mu}$, solid line) and quartiles (\hat{q}_1 , \hat{q}_3 , stippled lines). Red lines mark the corresponding parameters for the fitted distribution when they differ somewhat from the experts' estimates. Filled, black circles are point probabilities at zero for the ZIE-distribution. Dotted, black, vertical lines give the position of scaled reference values (= 1). Note that scaling of y-axes varies from figure to figure.

7.2.1 Notes

Note that only 50% of the “probability mass” lies within the inter-quartile range (\hat{q}_1, \hat{q}_3) , which means that there is a 50% chance that the “true” indicator value is outside that range. Thus, as seen in the following examples, **in distributions with large interquartile ranges, values very different from the mean value are not unlikely (cf. Fig. A1). So when specifying the quartiles, one should be careful not to set the interquartile distance so large that the resulting distribution produce unrealistic indicator values with some probability.**

When quartiles estimated by experts are located asymmetrically around the mean, the parameters of the fitted distribution may be displaced relative to the experts input. The reason for such displacement is that **input parameters from experts are inconsistent with the set of model distributions used in the elicitation process.** For example, a large upper quartile (\hat{q}_3) compared with both the other two parameters, results in a bad fit between specified parameter values and those in the resulting distribution (Fig A3). Such parameter values are not consistent with any unimodal probability distribution. One should therefore avoid such a combination of input parameters.

In the special case where experts set both quartiles identical to the mean, the result of the elicitation process is a distribution that for all practical purposes may be considered to be confined to a single value, which is equal to the estimated mean (Fig.A7). Therefore, if one think that indicator observations are accurate, one should specify quartiles equal to the mean.

7.2.2 Estimated quartiles symmetrical with respect to the mean

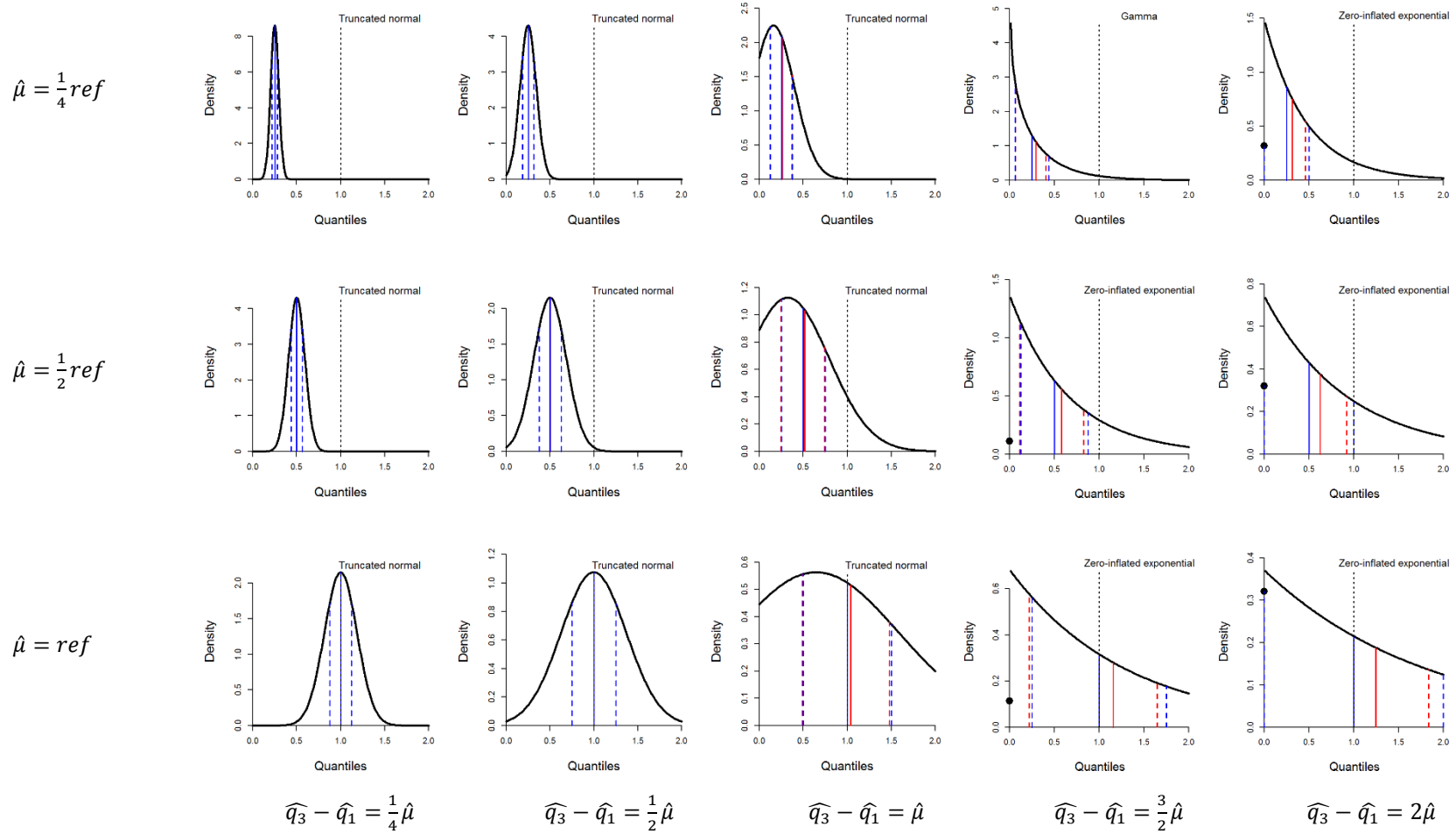


Fig A1. Examples where experts estimate quartiles to be equidistant from the mean. Nevertheless, all resulting distributions have positive skewness. This is because observations take nonnegative values only. As seen from the figure, skewness increases with interquartile distance and decreases with increasing mean.

7.2.3 Estimated quartiles asymmetrical with respect to the mean. Larger distance to lower quartile

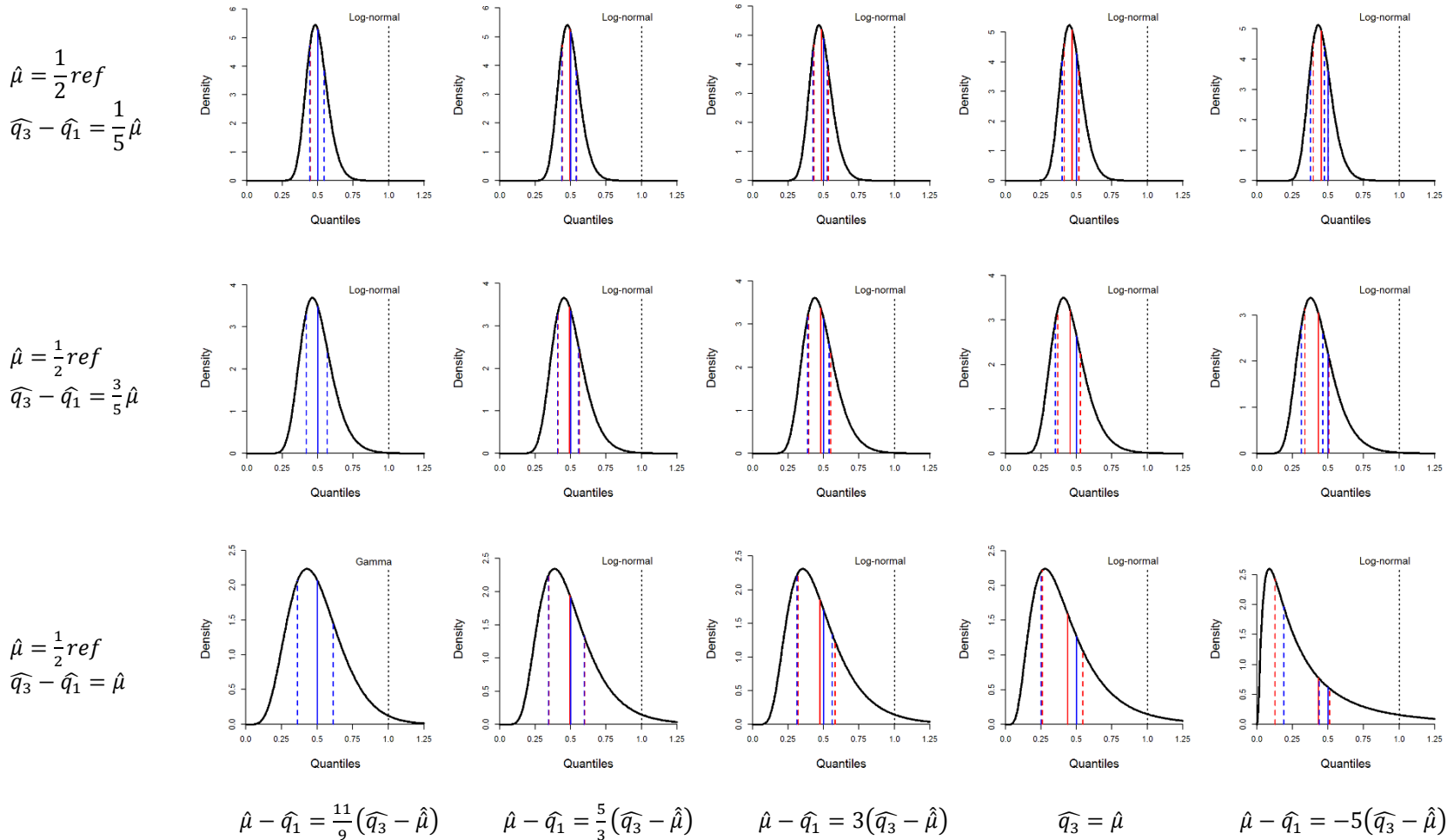


Fig. A.2 **Examples where experts estimate lower quartile to be more distant to the mean than the upper quartile.** Parameters of fitted distributions do not conform well with experts' input when the asymmetry in the quartiles position around the mean increases. The expected value of the fitted distribution becomes more displaced to the left of the estimated mean.

7.2.4 Estimated quartiles asymmetrical with respect to the mean. Larger distance to upper quartile

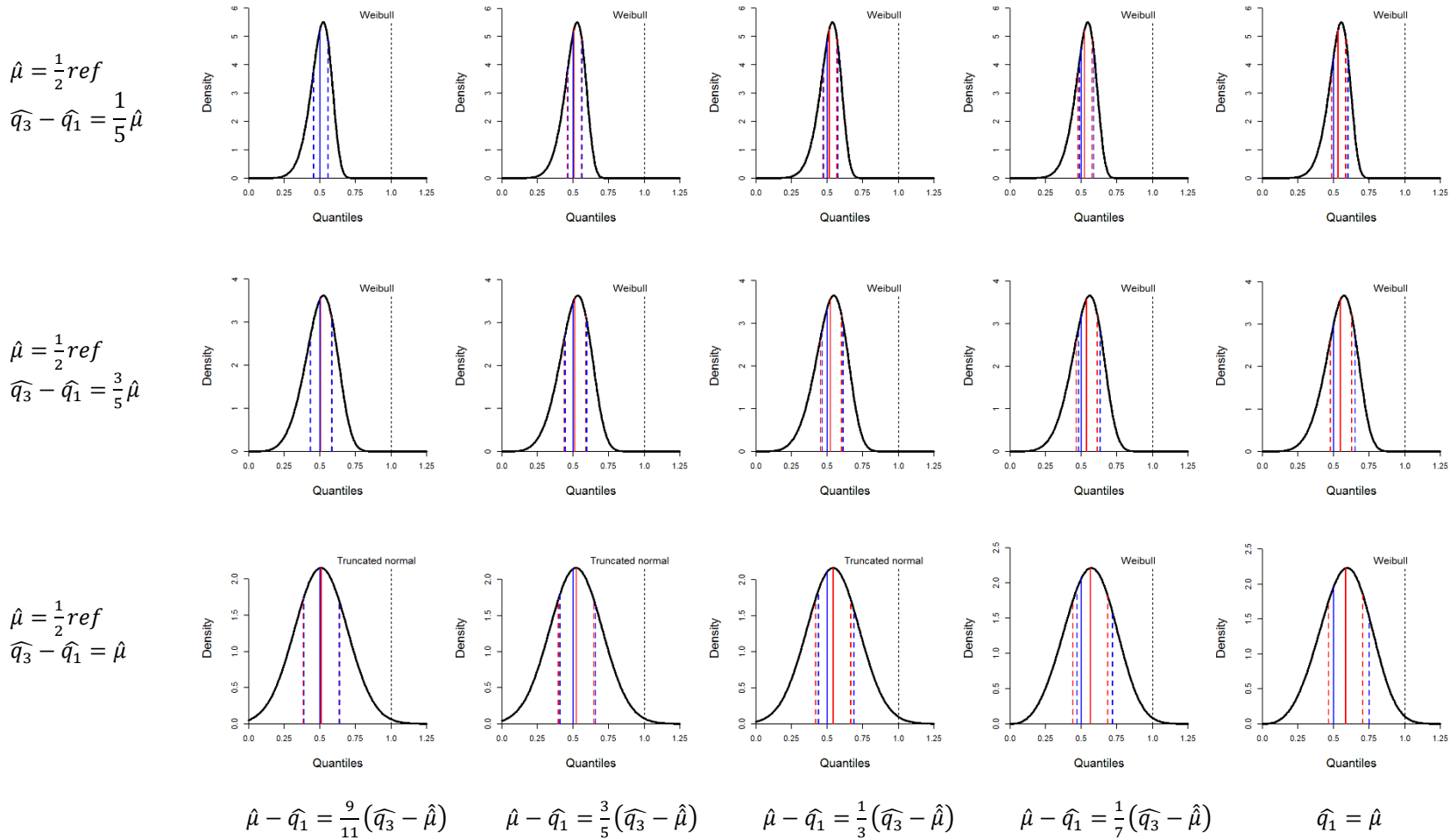


Fig. A.3 **Examples where experts estimate upper quartile to be more distant to the mean than the lower quartile.** In these examples parameters of fitted distributions do not conform well with experts' input when interquartile range increases. **The reason for the bad fit is that input parameters become inconsistent with the set of (unimodal) model distributions.**

7.2.5 Estimated mean values close to zero. Quartiles symmetrical with respect to the mean.

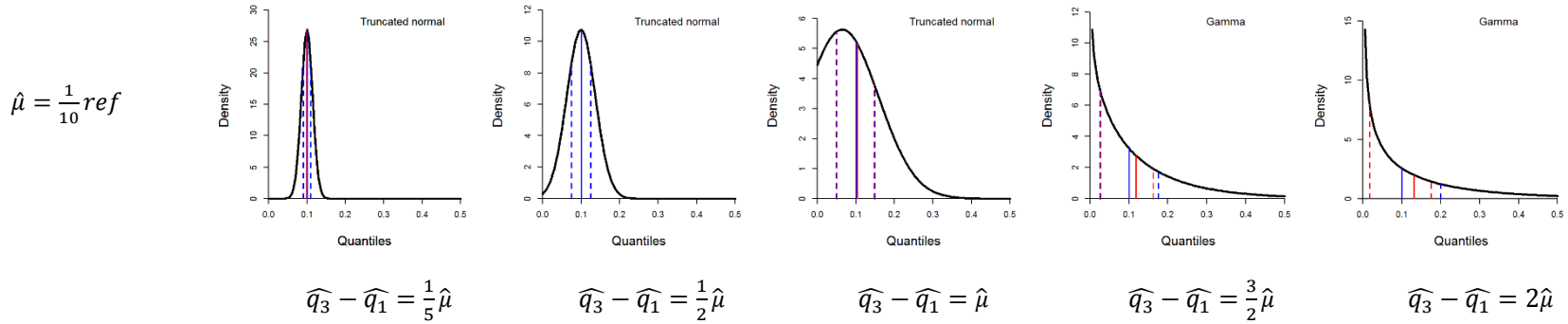


Fig A4. Examples where experts estimate a mean close to zero and quartiles to be equidistant from the mean. Compare with fig. A1.

7.2.6 Estimated mean values close to zero. Quartiles asymmetrical with respect to the mean.

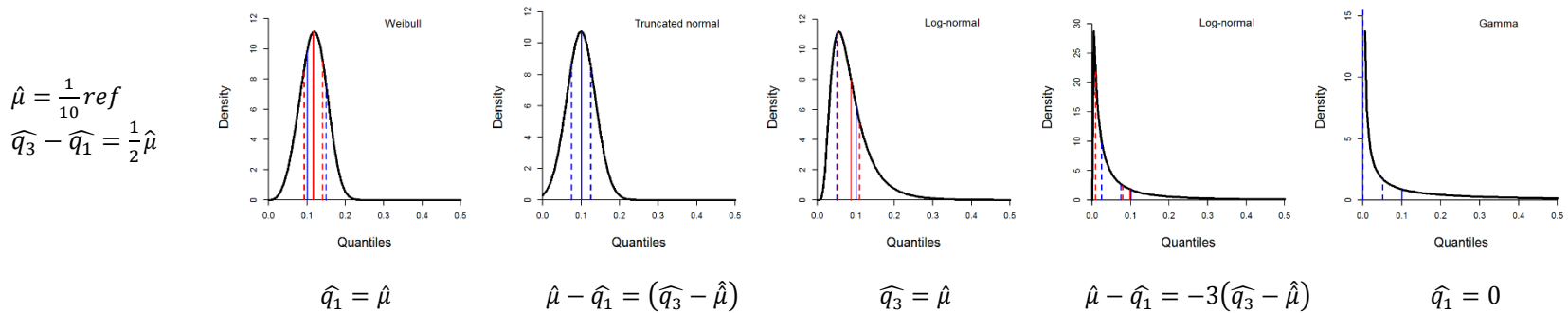


Fig A5. Examples where experts estimate a mean close to zero and quartiles to be equidistant from the mean. Compare with figs. A2 and A3.

7.2.7 Special case: Lower or both quartiles zero.

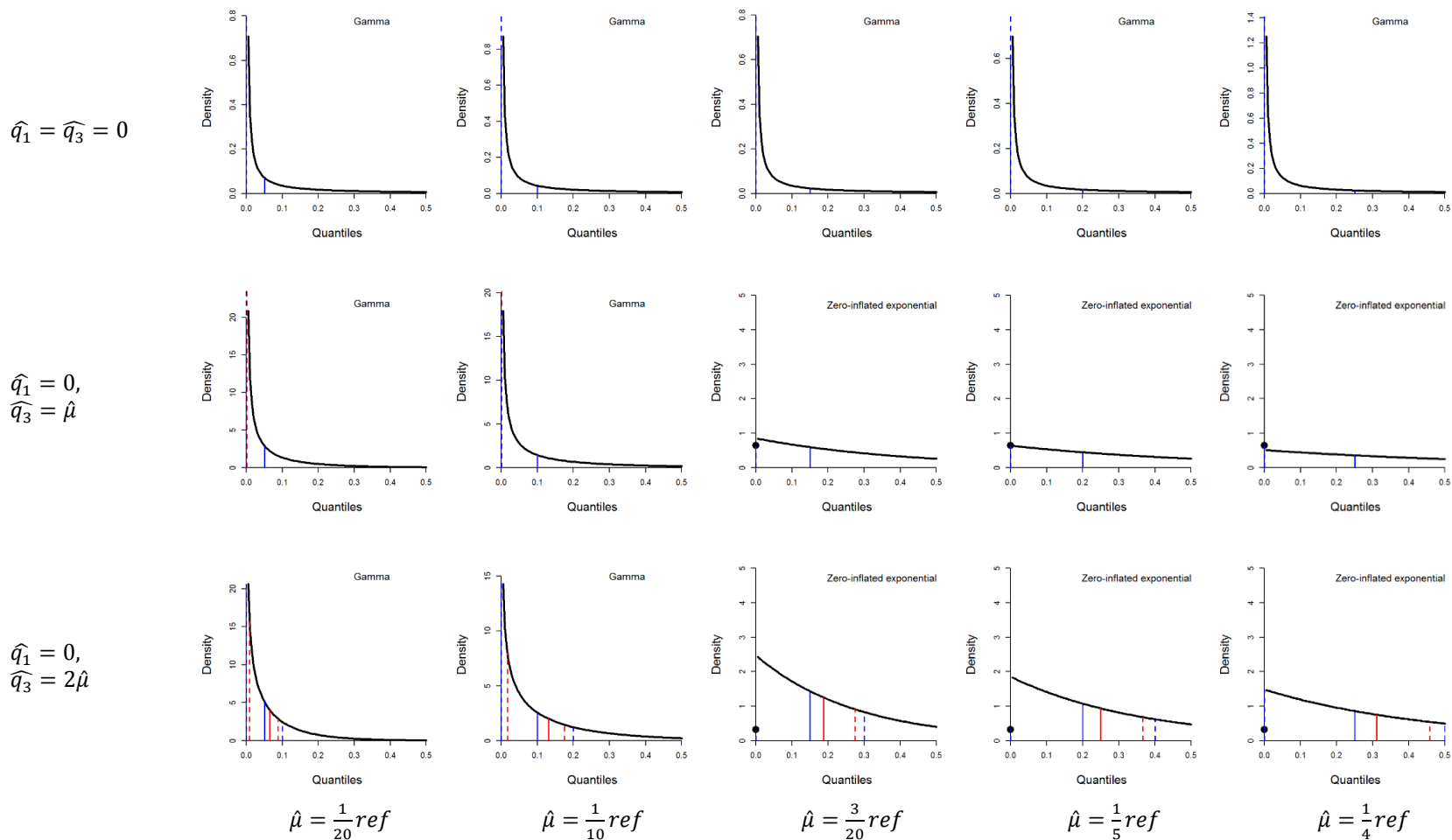


Fig A6. Examples where experts estimate the lower quartile to zero. In the first row, both quartiles are estimated to be zero.

7.2.8 Special case: No uncertainty - both quartiles equal to the mean value.

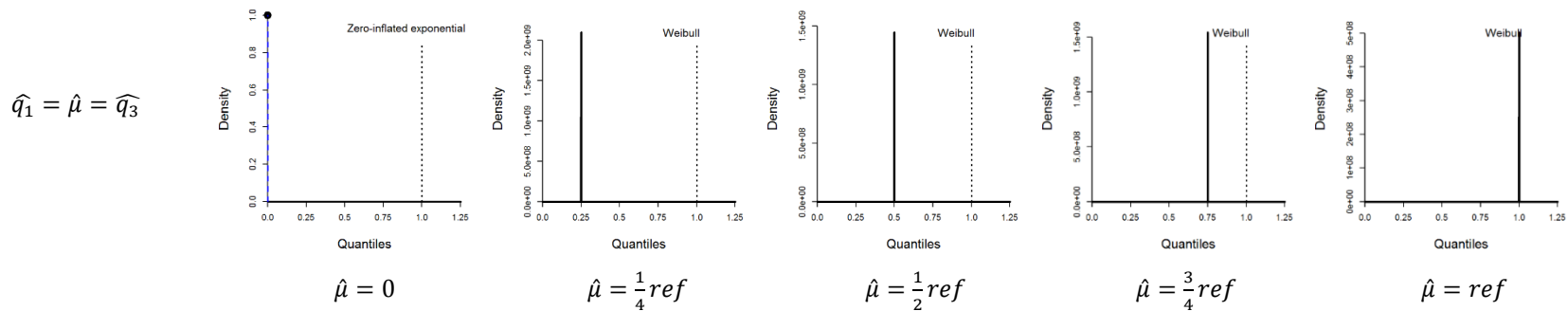


Fig A7. Examples where experts' estimates are certain. Both quartiles are set equal to the mean. The fitted distributions are in all cases (may for all practical purposes be considered to be) confined to a single value, which is equal to the estimated mean.



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