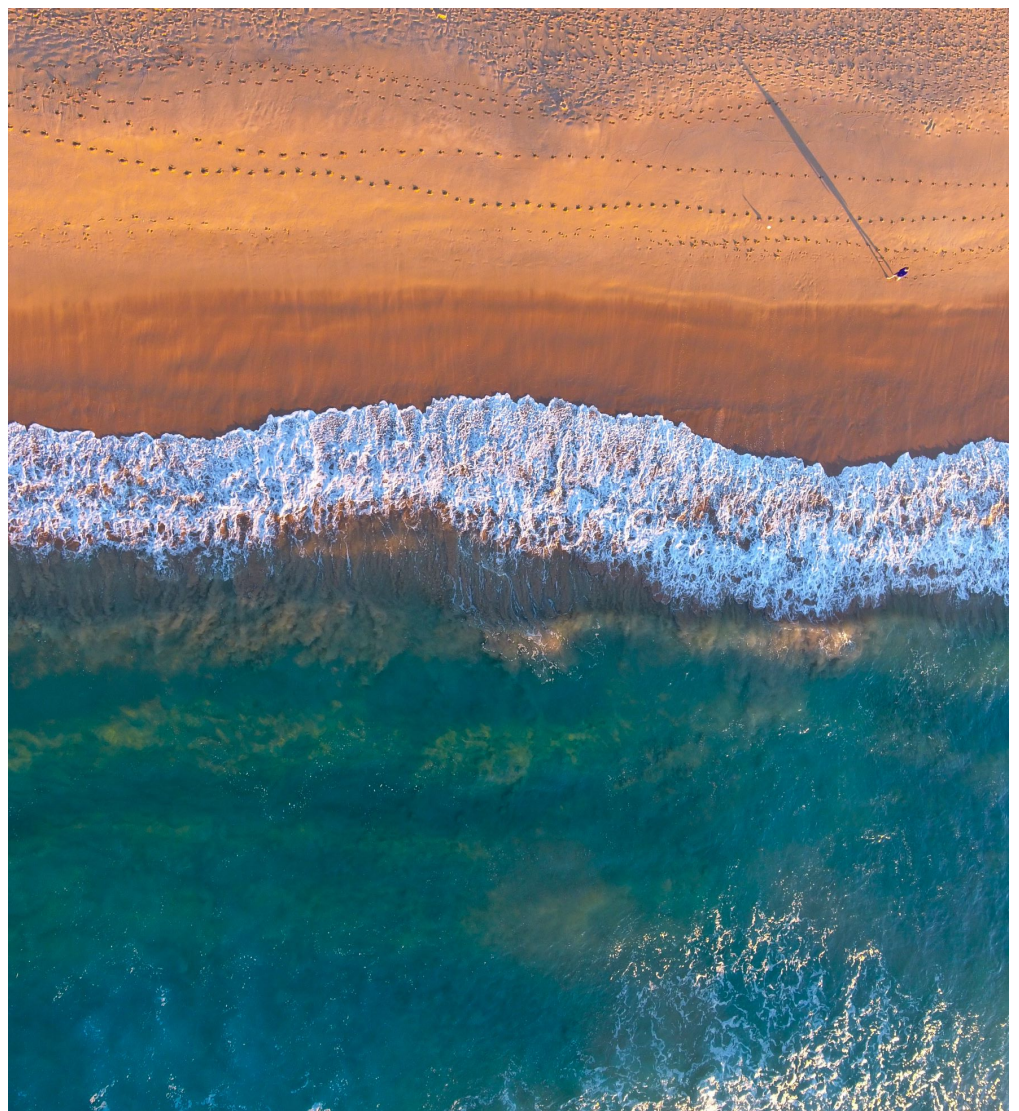


## Data Guidelines and Policies

# Biological Plankton Data

Version 3 | February 2024

**ICES GUIDELINES  
AND POLICIES**



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# ICES Guidelines and Policies - Data

## Biological Plankton Data

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## i Background

### Guidelines scope

ICES Data Guidelines exist to support and promote expert science and, when properly adopted, ensure data are more efficiently handled and accurately managed. ICES operational Data and Information Group (DIG) has developed guidelines to assist those involved in the collection, processing, quality control, and exchange of various types of oceanographic data. These guidelines have been adopted by ICES Data Centre and are recommended to all data centres within the broader ICES community. Each set of guidelines addresses the data and metadata requirements of a specific data type. These guidelines address the data and metadata requirements of phytoplankton and zooplankton sampling.

### Changes since the last version

Location	Change description
i: Guideline scope	Added new Guidelines Scope section to align with new format requirements
Section 1: Introduction	Moved opening text to a new Introduction section to align with new format requirements; add new examples of sampling equipment
Section 2.1: Data standard	Added CSV format as an example of ASCII; added reference to genetic analyses
Section 2.2: Format description	Added CSV format as an example of ASCII format
Section 2.3: Collection details	Added new details to be recorded (e.g. Principal Investigator, data collector, data supplier, storage details of samples for genetic analysis)
Section 2.4: Analysis details	New section
Annex 2: Log sheets	New introduction to log sheet added; new fields and notes added.

### Other relevant information

ICES Data Guidelines are written, updated and maintained by ICES DIG. The guidelines are reviewed from time to time by ICES Expert Groups.

# 1 Introduction

ICES Data Guidelines exist to support and promote expert science and, when properly adopted, ensure data are more efficiently handled and accurately managed. ICES Data and Information Group (DIG) have developed guidelines to assist those involved in the collection, processing, quality control, and exchange of various types of oceanographic data. Each set of guidelines addresses the data and metadata requirements of a specific data type. The guidelines presented here address the data and metadata requirements of phytoplankton and zooplankton sampling.

In the context of these guidelines, phytoplankton or zooplankton sampling may be accomplished using either a vertical, horizontal, or oblique tow of a net or from a range of water sampling devices. In the case of a net, such a device would consist of a frame, housing mesh used in collecting the sample. An example may be a square frame with multiple nets, or a single, conical shaped mesh with a circular ring opening. Typical mesh sizes would be less than 1 000  $\mu\text{m}$  (micrometres). At the mouth end, the opening may be up to 2 m. Attached at the small end of the net would be a jar or codend, some of which have an opening of about 10 cm. Examples of nets used for this type of sampling include WP2, Bongo, Apstein, and Multiple Opening/Closing Net and Environmental Sensing System(s) (MOCNESS).

## 2 Receiving Data

Data centres within ICES community require the following information from the data supplier (submitted along with the data). When receiving data, these data centres shall strive to meet the following guidelines.

### 2.1 Data standard

The data set should consist of header and data information in one or more standard ASCII (e.g. CSV) files. Each record should consist of date and time, navigation data, and measured parameters. It is recommended that each cruise constitute a single file. The navigation data should be in ASCII and should be in the form of latitude and longitude, in either degrees and decimal minutes or decimal degrees; explicitly state which format is being used. It is recommended that N, S, E, and W labels are used instead of plus and minus signs. Date and time must include month, day, year, hour, and minute. It is recommended that UTC be used.

All parameters must be clearly specified and described. If parameter codes are to be used, then the source data dictionary must be specified. Parameter units must be clearly stated. Parameter scales must be noted where applicable. If computed values are included, the equations used in the computations should be stated.

All relevant calibrations should be applied to the data, including laboratory and field calibrations. The data should be fully checked for quality and flagged for erroneous values, such as spikes or gaps. All checks and edits applied to the data should be explicitly stated.

Sufficient information and documentation should accompany the data so that they are adequately qualified and can be used with confidence by scientists/engineers other than those responsible for its original collection, processing, and quality control.

A brief description of the sample and data processing procedures must be included and should contain information regarding:

- Laboratory procedures and instrumentation
- Any species counts or mass measurements
- Description of any respiration, feeding, or physiological experiments and results (e.g. carbon dioxide rates, carbon and nitrogen measurements)
- Description of any genetic analyses (barcoding, metabarcoding including eDNA, metagenomics)
- Report on corrections, editing, or quality control procedures applied to the data
- Time (reporting in UTC is strongly recommended)
- Estimate of final uncertainty in the data

Information about any complementary/supplementary data collected at the same time should also be supplied.

If a cruise/data report is available describing the data collection and processing, this can be referenced. Where possible, a copy should be supplied with the data.

## 2.2 Format description

Data should be supplied in a fully documented ASCII (e.g. CSV) format. Individual fields, units, etc. should be clearly defined and the time zone stated. Reporting time using UTC is strongly recommended.

## 2.3 Collection details

Other pertinent information to be included in the data transfer to ICES data centres includes:

- Project, ship, cruise identifier
- Country, organization
- Principal Investigator, data collector, data supplier
- Station number, site (if appropriate)
- Date, time, latitude and longitude (for start and end if sampling via a net tow)
- Sounding, maximum and minimum pressure or depth of the tow
- Description of operational procedures: tow orientation (vertical, horizontal, or oblique), methods of position fixing (DGPS, GPS), etc.
- Weather conditions (including sun and wind)
- Gear type (e.g. net type, net mesh size, net mouth size, single or multi-net, water sampling device)
- Sample preservation method and details (e.g. fixed, frozen). If frozen, how and at what temperature? Which preservative/fixative was used, and what was the final concentration?
- Storage details of samples for genetic analysis (preferably cooled,  $-4^{\circ}\text{C}$ ,  $-10^{\circ}\text{C}$ , etc.), along with any treatment of samples within 24 hours of collection (refixation/exchange of alcohol, etc.)
- Data collection procedures (e.g. filtered size ranges, subsampling, length of time stored before analysis)
- Any additional information of use to secondary users that may have affected the data or have a bearing on their subsequent use. An example field log sheet is included in Annex 2.

## 2.4 Analysis details

It is useful to include the analysis protocols in the data transfer to ICES data centres. These should include:

- Analysis procedure
- Analysis instrument used and model number (flow cytometry, microscopy, FlowCam, Zooscan, etc.)
- Taxonomy (WoRMS identifier [Aphia ID] for each species identified)
- Details of replicate data analysis
- Any recognized data analysis issues

Include references where appropriate to help others understand the analysis protocols used.



## 3 Value Added Service

When processing and quality controlling data, data centres within ICES community shall strive to meet the following guidelines.

### 3.1 Quality control

A range of checks are carried out on the data to ensure that they have been imported into the data centres' format without any loss of information. These checks should include:

- General check of accompanying information (e.g. tow dates within cruise dates, correct cruise identifier)
- Plot navigation to ensure no land points; where possible, compare with cruise report/Cruise Summary Report track chart
- Flag suspicious data or correct after consultation with the data supplier
- Checks on ship speed

If the navigation data are supplied separately, they will be merged with the individual tows.

### 3.2 Problem resolution

The quality control procedures followed by ICES data centres will typically identify problems with the data and/or metadata. The data centres will resolve these problems through consultation with the originating Principal Investigator or data supplier. Other experts in the field or other data centres may also be consulted.

### 3.3 History documentation

All quality control procedures applied to a dataset are fully documented by the data centre. In addition, all quality control applied to a dataset should accompany that dataset. All problems and resulting resolutions will also be documented with the aim of helping all parties involved (i.e. the data centre, the collectors, and users). A history record will be produced detailing any data changes that the data centre may make, including dates of the changes.

## 4 Providing Data and Information Products

When addressing a request for information and/or data from the user community, the data centres within ICES community shall strive to provide well-defined data and products. To meet this objective, the data centres will follow these guidelines.

### 4.1 Data description

The data centre shall provide well-defined data or products to its clients. If digital data are provided, the data centre will provide sufficient information and documentation to accompany the data such that they are adequately qualified and can be used with confidence by scientists/engineers other than those responsible for their original collection, processing and quality control. Such information may include the following:

- A data format description fully detailing the format in which the data will be supplied
- Parameter and unit definitions
- Scales of reference
- Definition of flagging scheme (if flags are used)
- Relevant information included in the data file (e.g. ship, cruise, project, net tow deployment identifiers, start and end dates and times of tows)
- Data history document (as described in Section 4.2, below)

### 4.2 Data history

A data history document will be supplied with the data, to include the following:

- A description of data collection and processing procedures as supplied by the data collector (as specified in sections 2.1 and 2.3)
- Quality control procedures used to check the data (as specified in Section 3.1)
- Any problems encountered with the data and their resolution
- Any changes made to the data and dates of these changes
- Name of data collector and Principal Investigator
- Any additional information of use to secondary users that may have affected the data or have a bearing on its subsequent use

### 4.3 Referral service

ICES member research and operational data centres produce a variety of data analysis products and referral services. By dividing ocean areas into regions of responsibility and developing mutually-agreed guidelines on the format, data quality, and content of the products, better coverage is obtained. By having the scientific experts work in ocean areas with which they are familiar, the necessary local knowledge finds its way into the products. Data and information products are disseminated as widely as possible via a range of media.

If a data centre is unable to fulfil the client's needs, it will endeavour to provide the client with the name of an organization and/or person who may be able to assist. In particular, assistance from the network of data centres within ICES community will be sought.

## Annex 1: Detailed version history

Version	Date	Major changes	Author
3	Feb/2024	Minor updates, new section on analysis details added	ICES Data and Information Group (DIG)
2	Aug/2006	Minor updates	MDM
1	Aug/2001	Guidelines established	MDM

## Annex 2: Example net tow log sheet

Log sheets are an important requirement when biological plankton data are collected and should be drafted while at sea, so any problems or queries arising from any sampling can be dealt with promptly.

These sheets go further than recording the station position, time, etc. If carefully drafted, they will prompt users to record much of the information needed, including e.g. the type of net used, the type of tow, and the identity of the people who collected the data. Users should be encouraged to record as much relevant information as possible in the log sheet "Comments" box, especially any unusual features.

For vertical nets, you should record the rise time: that is, the time from bottom sampling depth to the surface.

When recording the volume of water filtered, you should clarify whether the volume was calculated theoretically or using a flowmeter. If a flowmeter is used, you should record the type of flowmeter.

Name: \_\_\_\_\_

### General

Project:		Ship:		Country:	
Cruise Number:		Tow Number:		Event Number:	
Location:					
Bottom Sounding:		Weather:		Wind:	

### Start Tow

Date:		Time (UTC):		Twilight:	
Latitude:		Longitude:		Method:	

### End Tow

Date:		Time (UTC):		Twilight:	
Latitude:		Longitude:		Method:	

### Details

Net type:		Net mouth size:		Mesh size:	
Tow type:		Wire angle:		Depth range: (wire out)	

Volume of water filtered:					
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Comments: