

**Database documentation: rec\_data**

**David O. Fisher**

NIWA Fisheries Data Management  
Database Documentation Series

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## Revision History

Version	Changed by	Reason	Date
1	David Fisher	Initial release	December 1988
2	David Fisher	Added tables t_observer and t_count_codes	11 May 2001
2	David Fisher	Added attributes proj_code to t_survey_codes & survey to t_effort	17 July 2002
2	David Fisher	Corrected section 5 table numbering	16 June 2003
3	David Fisher	Added Appendix 2 of Empress data types. Added comments attribute to t_survey_codes. alter t_effort.locality from char 40 to char 60. Added dist attribute to t_interview. Changed t_length.lgth from integer to decimal(4,1) and added attribute lgth_code.	December 2003
4	David Fisher	Completely restructured the t_response table so the natural key is now (survey, resp, year_s, month_s). Added weighting attribute to t_response table. Added width_meas attribute to t_length table	April 2004 June 2004

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# 1 Introduction to the Database Document series

The National Institute of Water and Atmosphere Research (NIWA) is Data Manager and Custodian for the research data owned by the Ministry of Fisheries (MFish).

The Ministry of Fisheries data sets incorporates historic research data, data collected or held by MAF Fisheries prior to the split in 1995 of policy to the Ministry of Fisheries and research to NIWA, and since 1995 data collected by NIWA and other research providers for the Ministry of Fisheries.

This document describes the recreational fishing database **rec\_data**, and is part of the database documentation series produced by NIWA. It supersedes the previous documentation by Fisher (1998)<sup>1</sup> on this database.

All documents in this series include an introduction to the database design, a description of the main data structures accompanied by an Entity Relationship Diagram (ERD), and a listing of all the main tables. The ERD graphically shows the relationships between the tables in **rec\_data**, and the relationships between these tables and other databases.

This document is intended as a guide for users and administrators of the **rec\_data** database.

Access to this database is restricted to specific nominated personnel as specified in the current Schedule 6 of the Data Management contract between the Ministry of Fisheries and NIWA. Any requests for data should in the first instance be directed to the Ministry of Fisheries.

## 2 Recreational fishing data

### 2.1 Data sources

The **rec\_data** database is designed for data from a range of recreational fishing surveys. In 1991, the Ministry of Fisheries (then MAF Fisheries) initiated marine recreational fishing catch and effort diary surveys and boat ramp surveys.

The first diary survey, in 1991-92, was of fishers living in the South region, (Bell *et al* 1993,) the second, in 1992-93, was of fishers living in the Central region (Ryan *et al*), and the third, in 1993-94, was of fishers living in the North region (Bradford 1996). A national survey was run in 1996 (Bradford 1998, Bradford *et al* 1998). Boat ramp surveys were run in the North region in 1990-91 (Sylvester 1993), the Central region in 1992-93 (Ryan *et al*), the North region in 1994, and nationally in 1996 (Hartill *et al* 1998). Boat ramp surveys have been run at a small number of locations in 1998 in the North region. Local diary surveys have been in areas of particular interest, including Patterson Inlet at Stewart Island from 1993-98, and Akaroa predominantly in 1997. Diary surveys have also been conducted for Bluff and Otago harbours, Fiordland and the Wellington region.

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<sup>1</sup> Fisher, D.O. 1998: Database documentation: **rec\_data**. *NIWA Internal Report No. 41*. 47p.

Data from shellfish harvest surveys at sites from December 1997 in the North region are also held in this database. (For a more detailed list of the surveys, refer to Appendix 3.)

Data are derived from 2 main sources: boat ramp and diary surveys.

For the boat ramp surveys the top level unit of sampling is a session, where an interviewer meets the fishers at the completion of their fishing trip at the boat ramp or beach. For each group or boatload of fishers intercepted, information including the time of the intercept is recorded. Assuming the group have been fishing as opposed to other activities, and that they agree to be interviewed, then details of the fishing effort of the individual fishers, including method used and location fished are recorded. Details of the length of species landed are recorded along with counts of the number of fish.

Shellfish harvest surveys are conceptually regarded as analogous to the boat ramp surveys.

Observer surveys are regarded as similar to the boat ramp surveys, however fishers are not interviewed but indicators of fishing effort are counted, e.g., boats, buoys or people fishing.

The diary surveys were mostly preceded by a telephone or intercept survey, that collected details of the diarists fishing practices in the last year and personal details including age and sex. The basic unit of fishing effort is a trip by a diarist or respondent. The trip data (which includes: the date of the trip, where fished, by what method, and for how long) was supplied by the diarists on a trip record form by return envelope through the post. These data include details of the catch including species and numbers caught. Note that one trip by a diarist on one day may be recorded as 2 or more trips on the database; if, for example, the diarist used 2 or more fishing methods that day. A subset of diarists in the national 1996 survey also filled out details of the length of snapper, kahawai, and blue cod from their catch. Some diarists from the Kaikoura survey also recorded the length of fish from their catch.

## 2.2 Data validation

While the **rec\_data** database enforces data validation and integrity rules with the use of referential constraints and range checks, the data go through a rigorous data validation and error checking process before being entered.

This process includes simple data validation using the **checkq**<sup>2</sup> validation program language and **perl** language scripts, followed by inserting data into a loading database where further checks are carried out. See Appendix 1 for a more detailed description of the processes involved.

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<sup>2</sup> See local Unix manual page on **checkq**.

## 3 Data Structures

### 3.1 Table relationships

This database contains several tables in 2 conceptually distinct schema for the boat ramp and diary surveys. The ERD for **rec\_data** (Figure 1) shows the logical structure<sup>3</sup> of the database and its entities (each entity is implemented as a database table), and the relationships between these tables and tables in other databases. This schema is valid regardless of the database system chosen, and it can remain correct even if the Database Management System (DBMS) is changed.

Each table represents an object, event, or concept in the real world that has been represented in the database. Each attribute of a table is a defining property or quality of the table. All of the table's attributes are shown in the ERD. The underlined attributes represent the table's primary key<sup>4</sup>.

Note that Figure 1 shows the main tables only. Several of the tables in the **rec\_data** database have foreign keys<sup>5</sup>, which contain standard NIWA/MFish fisheries codes, such as species. Foreign keys not only define the relationships between the tables in **rec\_data** but also provide links to the **rdb** (research database) database, which contains the definitive list of these standard codes; e.g., species codes. An ERD for these tables (Figure 2) shows the relationships between **rec\_data** and **rdb**.

All tables within external databases, such as those in **rdb**, are shown in the ERDs as being enclosed in dashed-line boxes.

The **rec\_data** database is implemented as a relational database; i.e., each table is a special case of the mathematical construct known as a *relation* and hence elementary relation theory is used to deal with the data within tables and the relationships between them. There are three types of relationships possible between tables, but only one exists in **rec\_data**: one-to-many<sup>6</sup>. These relationships can be seen in ERDs by connecting a single line (indicating 'many') from the child table; e.g., *t\_group*, to the parent table; e.g., *t\_session*, with an arrowhead (indicating 'one') pointing to the parent.

Every relationship has a mandatory or optional aspect to it. That is, if a relationship is mandatory, then it has to occur at least once, while an optional relationship might not occur at all. For example, in Figure 1, consider that relationship between the table *t\_group* and it's child table *t\_interview*. The symbol 'o' by the child *t\_interview* means that a group record can have zero or many interview records, while the bar by the parent *t\_group* means that for every interview there must be a matching group record.

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<sup>3</sup> Also known as a database *schema*.

<sup>4</sup> A primary key is an attribute or a combination of attributes that contains an unique value to identify that record.

<sup>5</sup> A foreign key is any attribute, or a combination of attributes, in a table that is a primary key of another table.

Tables are linked together through foreign keys.

<sup>6</sup> A one-to-many relationship is where one record (*the parent*) in a table relates to one or many records (*the child*) in another table; e.g., one session in *t\_session* (*the parent*,) can have many groups in *t\_group* (*the child*) but one group can only come from one session.

These links are enforced by referential constraints<sup>7</sup>. Constraints do not allow *orphans* to exist in any table; i.e., where a child record exists without a related parent record. This may happen when: a parent record is deleted; the parent record is altered so the relationship is lost; or a child record is entered without a parent record. Constraints are shown in the table listings by the following format:

```
Referential:  constraint name (attribute[, attribute]) |INSERT|
                                                         |DELETE|
                parent table (attribute[, attribute])
```

Note that the typographical convention for the above format is that square brackets [] may contain more than one item or none at all. Items stacked between vertical lines || are options of which one must be chosen.

For example, consider the following constraint found in the table *t\_length*:

```
Referential:  invalid species (species) INSERT rdb : curr_spp (code)
```

This means that the value of the attribute *species* in the current record must already exist in the parent table *curr\_spp* of the **rdb** database or the record will be rejected and the following message will be displayed:

```
*** User Error:  insert constraint 'invalid species' violation
```

For tables residing in external databases, the parent table name will be prefixed by the name of the database.

Section 5 lists all the **rec\_data** tables as implemented by the Empress RDBMS. As can be seen in the listing of the tables, a table's primary key has a unique index on it. Primary keys are generally listed using the following format:

```
Indices:    UNIQUE index_name ON  (attribute[, attribute])
```

where attribute(s) make up the primary key and the index name is the primary key name. These prevent records with duplicate keys from being inserted into the tables; e.g., a record with a response number (*resp*) for that survey, in *t\_phone*.

The database listing shows that the tables also have indices on many attributes. That is, attributes that are most likely to be used as a searching key have like values linked together to speed up searches. These indices are listed using the following format:

```
Indices:    NORMAL (2, 15) index_name ON (attribute[, attribute])
```

Note that indices may be simple, pointing to one attribute or composite pointing to more than one attribute. The numbers "... (2, 15) ..." in the syntax are Empress DBMS default values relating to the amount of space allocated for the index.

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<sup>7</sup> Also known as integrity checks.

### **3.2 Database design**

The structure of **rec\_data** has 2 parallel branches of tables, which share some common code tables. The two 'branches' hold data on the 2 main survey types, boat ramp and diary surveys. The boat ramp tables also contain data from shellfish harvest surveys and observer surveys. In some years both boat ramp and diary surveys were conducted, for example 1996 when a national survey was conducted, or 1994 in the North region. In other years only one type of survey was conducted (in that region); for example, the North region boat ramp survey in 1991, or the South region diary survey in 1992.



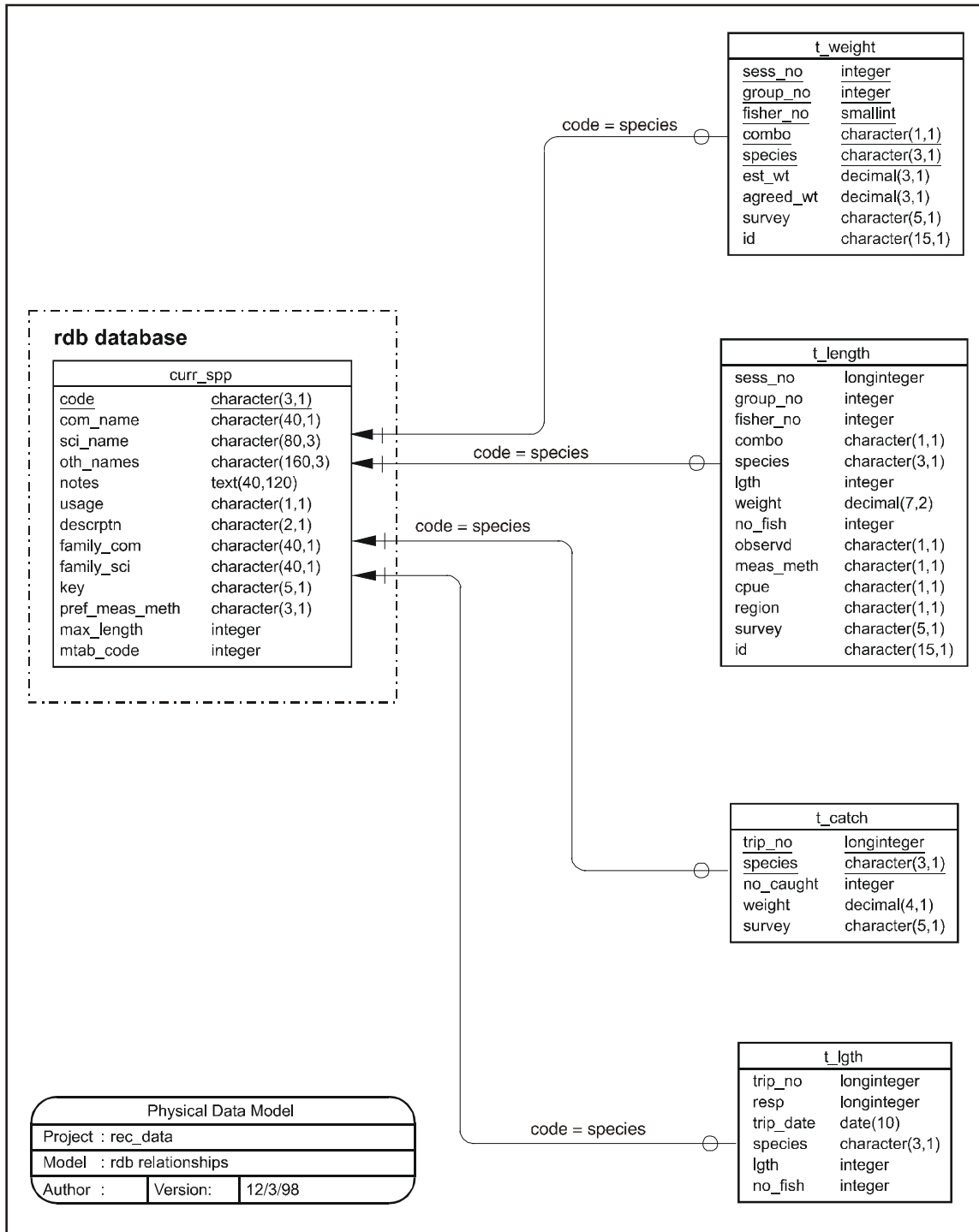


Figure 2: ERD showing the relationships between the tables t\_weight, t\_length, t\_catch, and t\_lgth, and curr\_spp in the **rdb** database.

### 3.2.1 Boat ramp and shellfish harvest tables

The ERD for these surveys is shown in Figure 3. For the boat ramp data the top-level table is *t\_session* (Table 1, section 4.1). This holds information for each session at a boat ramp or beach etc. A session number, represented by the attribute *sess\_no*, which is also the table's primary key, identifies each record. This session number is a unique computer generated number assigned to each session at the time of loading the data to the **rec\_data** database. The attribute *survey* is a foreign key that provides a link to *t\_survey\_codes*, and which can be used to distinguish shellfish harvest surveys from other surveys.

For the shellfish harvest data only, during the session, hourly counts were made of the number of pickers (or fishers) harvesting shellfish within the spatial strata into which the beach was divided. These data are stored in the table *t\_fisher\_count* (Table 2), with a primary key of *sess\_no*, *hr*, and *fish\_loc*. This table is a 'dead end branch' of the database structure; i.e., it has no child records. NB: The stratum number (i.e., 'Strata No.' as labelled on the data form) is recorded in the attribute *fish\_loc* in the tables *t\_fisher\_count* and *t\_interview* for the shellfish harvest data.

For each session, details about the group intercepted are stored in the table *t\_group*, (Table 3) with a primary key of *sess\_no* and *group\_no*. Provided the interviewer is not busy interviewing another group, then the group is asked if they have been fishing, and if so if they consent to be interviewed. The intercept outcome; i.e., if the group were interviewed, not interviewed, or were engaged in other activities (water skiing, picnicking etc), is recorded along with the group type - namely the type of boat, or shore fishing. For most surveys the intercept time is recorded. This is defined as the time the group arrived at the boat ramp, or when the shellfish harvesters come off the beach.

Each interview from the group is stored in *t\_interview*, with the attributes *fisher\_no* and *combo* added to the primary key of *t\_group* to become the primary key of this table. For the boat ramp surveys the interviews are conducted with each fisher separately, hence the attribute for fisher number. With the shellfish harvest surveys, the interviews are conducted with the group as a whole, and not separately by each fisher, and so a fisher number of -1 is assigned to these records.

The attribute *combo*, in conjunction with other attributes, is used to generate a primary key for interview records where a fisher used more than 1 combination, of target species, fishing method or location. For example, a fisher may have fished in the morning targeting snapper, and then in the afternoon targeted kahawai. Most fishing trips (i.e., 80-90%) are fairly standard and do not involve more than 1 combination. For the national 1996 boat ramp survey the combo was recoded as part of the checking and formatting process so that *combo=A* became *combo=1*, *combo=B* became *combo=2* etc.

For the shellfish harvest survey data, an interviewer usually estimated and weighed the catch of each species harvested and these data are stored in the table *t\_weight*. Species is added to the primary key of *t\_interview* to create the primary key for *t\_weight*. For the Kaikoura survey, catches as recorded at the boatramp are stored in *t\_weight*.

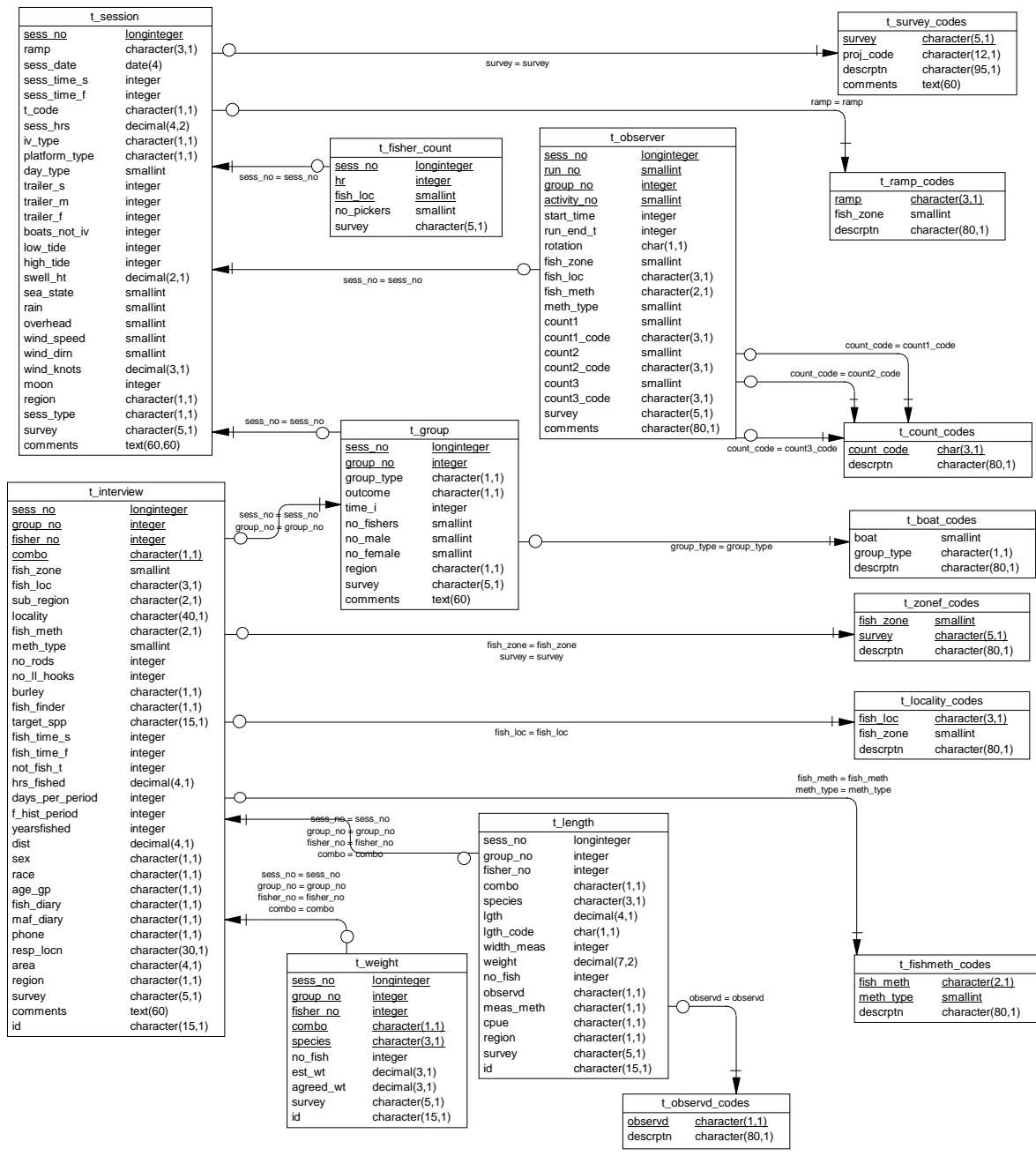


Figure 3: ERD for the boat ramp and shellfish harvest surveys

For both boat ramp and shellfish harvest data, individual fish or shellfish may be measured for length, or simply counted for some boat ramp data records, for example, if the fish was headed and gutted (see the attribute *obsrvd* which is a foreign key to *t\_obsrvd\_codes*, for the state of the fish recorded). These length or species count data are stored in the table *t\_length* which does not have a primary key. The conceptual primary key would be *sess\_no*, *group\_no*, *fisher\_no*, *combo*, *species*, *lgth*, and *obsrvd*. As the attribute for fish length, *lgth* may legitimately be null if a species is only counted, it is not possible to enforce a primary key. This table holds individual weights for fish from the North region 1994 boat ramp survey.

### 3.2.2 Diary survey tables

The ERD for the diary surveys is shown in Figure 4. For these surveys, the table *t\_phone* is the top-level table, which has a primary key of *survey* and *resp* where *resp* is the (potential) diarist's respondent number. This table includes details about the person's fishing practices over the past year and personal details including their sex, age, and ethnic group.

For the Central region diary survey in 1993 a supplementary telephone questionnaire was used asking details about scallop fishing. These data are stored in the table *t\_sca*.

The table *t\_response* holds data for the response status of each respondent; i.e., if the diarist went fishing in the quarter concerned etc. The primary key for this table is *key*, with a natural primary key of *resp*, *survey*, *year\_s* and *month\_s*.

The main diary survey table is *t\_effort*, which has a primary key of *trip\_no*. The trip number is an unique computer generated number assigned at the data checking and formatting stage. This table has four foreign keys to code tables in this database, all of which are shared with the boat ramp table structure.

The effort comprising a fishing trip may result in a catch, the results of which are stored in *t\_catch*. Species is added to the primary key of *t\_effort* to become the primary key for this table.

For the national 1996 diary survey a subset of diarists were asked to measure their catch of snapper, kahawai, and blue cod. These lengths are stored in *t\_lgth*. Since the diarists were only asked to record the date of the trip that caught these species measured, and as some diarists occasionally make 2 or more 'trips' per day; e.g., by using different methods, it was not always possible to assign a trip number to records in *t\_lgth*. Hence this table does not have a primary key, and there are some orphaned records in this table. Most records have a trip number assigned and can be joined to *t\_catch* using the attributes *trip\_no* and *species*, or *trip\_no* to join to records in *t\_effort*. The diarists in the Kaikoura survey also recorded lengths of their fish which are stored in *t\_lgth*.

There are a number of views particularly of the tables *t\_effort* and *t\_catch*, with more or less 1 view per survey on each of these 2 tables. For example, *v\_sou92\_effort* filters the records of *t\_effort* for those records where *survey* = 'SOU92'. With *v\_sou92\_catch* providing the corresponding filter for the catch records. Similar views exist for the Central, North, and national surveys. These views only show the data available for any particular survey; i.e., they exclude attributes for which there are no data. For example, the attribute *SCAarea* is only shown in the CEN94 view, as this survey is the only one that collected these data.

Users are recommended to use these views, particularly if they want to extract data from one of these diary surveys, as these views in some cases also filter out records that are generally invalid for analysis; e.g. outside the date range.

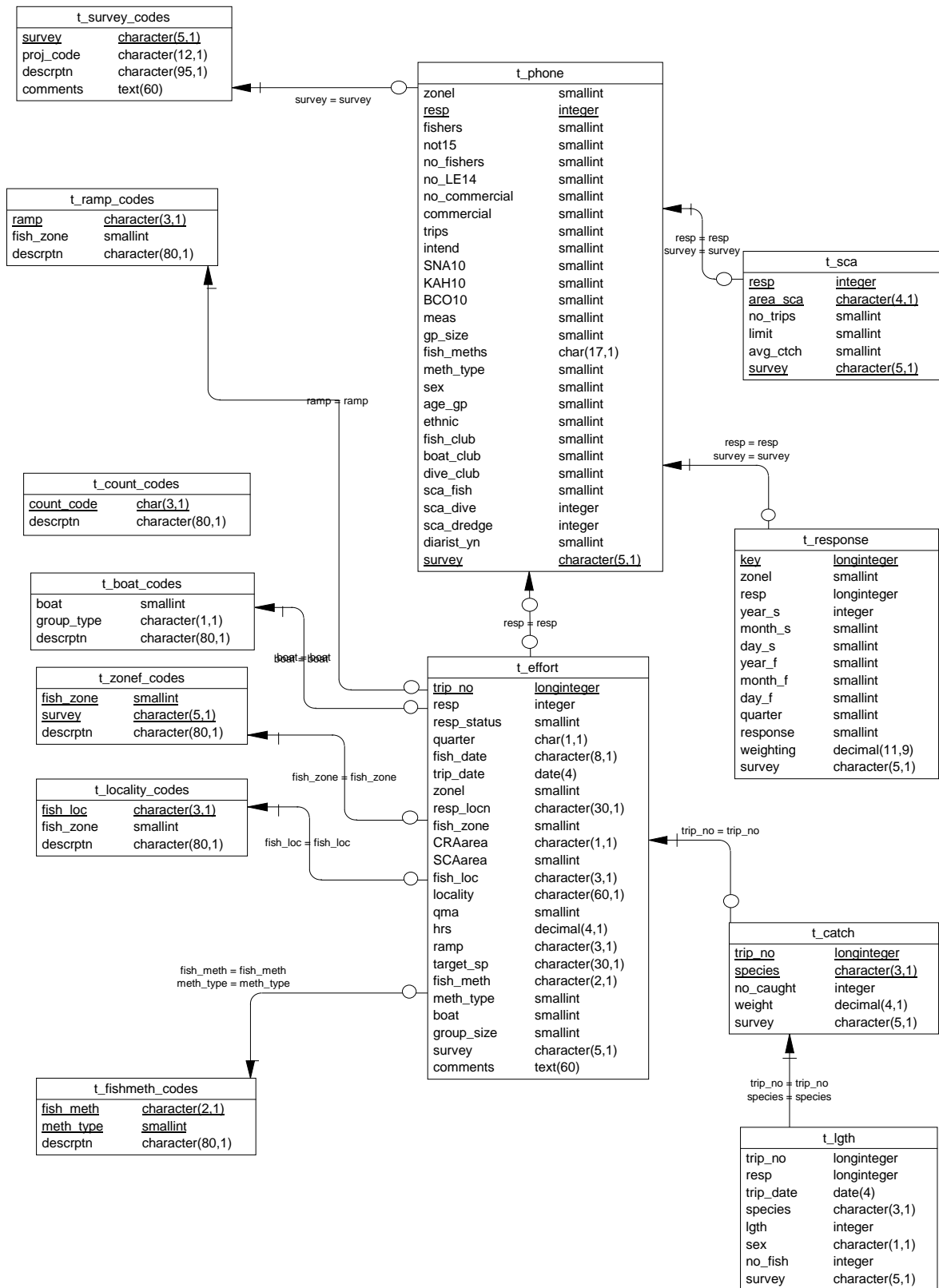


Figure 4: ERD for the diary surveys

### 3.2.3 Common code tables

Both table structures share 6 common code tables that define the codes used for the respective attributes in the main data tables. The table *t\_survey\_codes* describes the codes used for the attribute *survey*.

The table *t\_zonef\_codes* defines the *fish\_zone* attribute in *t\_effort* and *t\_interview*. These fishing zones were defined for each diary survey, as subdivisions of Quota Management Areas (QMAs). These fishing zones were often assigned in each corresponding boat ramp survey where applicable. See Appendix 4 for maps of the fishing zones as used in the various surveys.

The table *t\_locality\_codes* holds descriptions and the *fish\_zone* for the attribute *fish\_loc*. This attribute is a 3-character code used to assign fishing locations, mostly by boat ramp interviewers, to small sections of coastline. Some of the trips in the national 1996 diary survey were assigned to a *fish\_loc* based on the fishing locality descriptions given by the diarists.

The various surveys have led to the creation of several fishing method coding series, which are documented in *t\_fishmeth\_codes*. The attribute *meth\_type* identifies which coding series is used for each fishing method as stored in the attribute *fish\_meth*. The North region boat ramp surveys have used 2 character codes for *fish\_meth*, while most of the other surveys have used a 2 numeric code. The North region diary survey separated the boat type out from the fishing method and recorded this separately (in *t\_effort.boat*) whereas most method types include boat as part of the fishing method.

The table *t\_ramp\_codes* has the description for each ramp code, and the fishing zone from the national 1996 survey in which each ramp is located. This table documents the *ramp* attribute in the tables *t\_session* and *t\_effort*. For the North region boat ramp surveys a series of 2 character codes were used. These codes represent a coastal location with most of these 2 character codes representing boat ramps. A small number of codes are specifically for marinas. For the shellfish harvest survey 'ramp' codes were assigned to beaches surveyed. An additional attribute, *iv\_type* in *t\_session* has codes for: ramp, beach, roving boat, other, or marina as 1 to 5 respectively. For the national 1996 diary survey diarists were asked to specify the 'boat departure point'. This description was assigned to a 'ramp' code, either one of the existing 2 character codes from the North region or a new 3 character code.

The table *t\_boat\_codes* documents the codes used with the attributes *boat* and *group\_type*. Most of these codes have a 1 to 1 relationship between *boat* and *group\_type*. The attribute *boat* describes the boat type used in the diary survey, currently only for the NOR94 survey. The boat type has been combined with the fishing method in other surveys. The attribute *group\_type* describes the boat type, or if shore fishing, for the boat ramp surveys.

## 4 Table Summaries

The **rec\_data** database has 12 main tables containing data, plus additional tables documenting the codes used in the database. There are a number of views of the tables *t\_effort* and *t\_catch* which show the data from individual surveys. The following is a listing and brief outline of the tables contained in **rec\_data**.

### 4.1 Boat ramp and shellfish harvest tables:

1. **t\_session** : contains details of location, date, time, and environmental data regarding a session, recording details of fishers returning from a fishing trip.
2. **t\_fisher\_count** : contains counts of the number of fishers collecting shellfish on areas of the beach for a shellfish harvest survey.
3. **t\_group** : contains details about the boat or group of people including if they were fishing.
4. **t\_interview** : contains details from an interview with the fisher(s) including fishing effort, method, and area information.
5. **t\_weight** : contains the weights of the species caught in a shellfish harvest survey.
6. **t\_length** : contains lengths or counts of fish caught or shellfish harvested by the fisher being interviewed.
7. **t\_observed\_codes** : documents the observed codes used in the attribute *t\_length.observed*.
8. **t\_observer** : contains counts of observations of fishing activity.
9. **t\_count\_codes** : documents the attributes count1code, count2code and count3code in the table *t\_observer*.
10. **t\_ctch\_cen93** : contains catch details by species for the CEN93 survey.  
The data were collected in a different format (e.g., the weights are total catch weights).
11. **t\_len\_cen93** : contains fish lengths from the CEN93 survey.  
The data were collected in a different format.

### 4.2 Diary survey tables:

1. **t\_phone** : contains the data from the initial telephone or intercept questionnaire, including details of their fishing practices, age and sex.
2. **t\_sca** : contains details of the respondent's recent scallop fishing trips. Currently for the Central region survey only.
3. **t\_response** : contains response status details for each respondent for each quarter of the year; i.e., if they made any fishing trips or not, and whether contact had been maintained.
4. **t\_effort** : contains fishing effort information by trip for each respondent.
  - (a) **v\_cen93\_effort** : a view of effort data where *survey* = 'CEN93'<sup>8</sup>.
  - (b) **v\_cen94\_effort** : a view of effort data where *survey* = 'CEN94'.
  - (c) **v\_nat96\_effort** : a view of effort data where *survey* = 'NAT96' and *resp not in* (3578, 3579, 47, 446, 1215, 1249) and *fish\_date match* '\*96'.

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<sup>8</sup> See Appendix 2 for an explanation of the *survey* codes referred to above.

- (d) **v\_nat97\_effort**<sup>9</sup> : a view of effort data from the national survey in 1997, where *survey* = 'NAT97' and *fish\_date match* '\*97'.
  - (e) **v\_nor94\_effort** : a view of effort data where *survey* = 'NOR94'.
  - (f) **v\_sou92\_effort** : a view of effort data where *survey* = 'SOU92'.
  - (g) **v\_sou93\_effort** : a view of effort data where *survey* = 'SOU93'.
5. **t\_catch** : contains the number of the species caught and for some surveys the weight.
- (a) **v\_cen93\_catch** : a view of catch data where *survey* = 'CEN93'.
  - (b) **v\_cen94\_catch** : a view of catch data where *survey* = 'CEN94'.
  - (c) **v\_nat96\_catch** : a view of catch data where *survey* = 'NAT96'.
  - (d) **v\_nat97\_catch** : a view of catch data where *survey* = 'NAT97'.
  - (e) **v\_nor94\_catch** : a view of catch data where *survey* = 'NOR94'.
  - (f) **v\_sou92\_catch** : a view of catch data where *survey* = 'SOU92'.
  - (g) **v\_sou93\_catch** : a view of catch data where *survey* = 'SOU93'.
6. **t\_lgth** : has the length of selected diarists catches, currently of snapper, kahawai, and blue cod from the national 1996 survey. Data from the survey 'KAI99' is also included in this table

### 4.3 Shared code tables:

1. **t\_survey\_codes** : documents the codes used in the attribute *survey*.
2. **t\_zonef\_codes** : lists the fishing zones as defined for the diary surveys.
3. **t\_locality\_codes** : describes the area codes used in the attribute *fish\_loc* for fishing locality.
4. **t\_fishmeth\_codes** : documents the fishing method codes used.
5. **t\_ramp\_codes** : lists the codes used for boat ramps, beaches, and boat departure points used by fishers.
6. **t\_boat\_codes** : lists the codes used for the attributes *boat* and *group\_type*.

---

<sup>9</sup> For those respondents in the 1996 national diary survey who were not valid continuing diarists in 1997, the survey attribute has been set to 'NAT96' in *t\_effort* and *t\_catch* to exclude these records from *v\_nat97\_effort*.

## 5 rec\_data Tables

The following are listings of the tables in the **rec\_data** database, including attribute names, data types (and any range restrictions), and comments.

### 5.1 Boat ramp and shellfish harvest tables:

#### 5.1.1 Table 1: t\_session

**Comment:** Boat ramp or shellfish harvest session.

Attributes	Data Type	Null?	Comment
sess_no	longinteger	No	Session number.
ramp	character(3,1)	No	Code for boat ramp or beach etc where the session was conducted, refer t_ramp_codes.
sess_date	date(4)	No	Session date.
sess_time_s	integer		Session time start (24 hour, HHMM format).
sess_time_f	integer		Session time finish (24 hour, HHMM format).
t_code	character(1,1)		Time of day code.
sess_hrs	decimal(4,2)		Length of the time period in decimal hours covered by this session.
iv_type	character(1,1)		Interview type: 1=Ramp, 2=Beach, 3=Roving boat, 4=Other, 5=Marina, 6=Fixed, 7=Roving.
platform_type	character(1,1)		Platform the session was conducted from: A=Aircraft, B=Boat, L=Land.
day_type	smallint		Day type: 1=Weekend or Public holiday, 2=Weekday, 3=Contest.
trailer_s	integer		Number of trailers in the car park at start of the session.
trailer_m	integer		Number of trailers in the car park at middle of the session.
trailer_f	integer		Number of trailers in the car park at finish of the session.
boats_not_iv	integer		Number of boats not interviewed.
low_tide	integer		Time of low tide in 24-hour hhmm format.
high_tide	integer		Time of high tide in 24 hour hhmm format.
swell_ht	decimal(2,1)		Swell height in metres.

Attributes	Data Type	Null?	Comment
sea_state	smallint		Sea conditions, refer to Appendix 3 of the database documentation for the codes.
rain	smallint		Rain, refer to Appendix 3 of the database documentation for the codes.
overhead	smallint		Overhead conditions, refer to Appendix 3 of the database documentation for the codes.
wind_speed	smallint		Wind speed, refer to Appendix 3 of the database documentation for the codes.
wind_dirn	smallint		Wind direction, refer to Appendix 3 of the database documentation for the codes.
wind_knots	decimal(3,1)		Wind speed in knots.
moon	integer		Moon phase.
region	character(1,1)		Survey base region: N=North ie Auckland, C=Central& South ie the rest.
sess_type	character(1,1)		Session type code, conducted by: I=Interview, O=Observer.
survey	character(5,1)		Survey code: 3 chars for region + 2 numerics for year, refer t_survey_codes.
comments	text(60,60,60,1)		
Creator:	smdof		
Referential:	INVALID SESSION SURVEY (survey) INSERT t_survey_codes (survey)		
Indices:	INVALID t_session ramp (ramp) INSERT t_ramp_codes (ramp)		
	UNIQUE t_session_pk ON (sess_no)		
	NORMAL (2, 15) sess_ramp_ndx ON (ramp)		
	NORMAL (2, 15) sess_date_ndx ON (sess_date)		

### 5.1.2 Table 2: t\_fisher\_count

**Comment:** Fisher count data for shellfish harvest surveys.

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
sess_no	longinteger	No	Session number.
hr	integer	No	Hour, ie time of this count.
fish_loc	smallint	No	Strata No, for a spatial strata (area) of the beach
no_pickers	smallint		Number of pickers (or fishers)
survey	character(5,1)		Survey code: 3 chars for region + 2 numerics for yr
<b>Creator:</b>	smdof		
<b>Referential:</b>	t_fisher_count refer (sess_no) INSERT t_session (sess_no)		
<b>Indices:</b>	UNIQUE fishercount_pk ON (sess_no, hr, fish_loc)		

### 5.1.3 Table 3: t\_group

Comment: Boat ramp survey, boat or shellfish harvest group details.

Attributes	Data Type	Null?	Comment
sess_no	longinteger	No	Session number.
group_no	integer	No	Group number for shellfish harvest or boat number for boat ramp survey.
group_type	character(1,1)		Group type, ie boat type, refer t_boat_codes.
outcome	character(1,1)		Intercept outcome I=Interviewed, N=Not interviewed, R=Refused, O=Other, Z=Incomplete, X=Interviewed but invalid for CPUE analysis
time_i	integer		Time of intercept of fishing group (24 hour, HHMM format).
no_fishers	smallint		Number of fishers in the group.
no_male	smallint		Number of male fishers in the group.
no_female	smallint		Number of female fishers in the group.
region	character(1,1)	No	Survey base region: N=North, C=Central & South.
survey	character(5,1)		Survey code: 3 chars for region + 2 numerics for yr
comments	text(60,60,60,1)		
<b>Creator:</b>	smdof		
<b>Referential:</b>	t_group refer (sess_no) INSERT t_session (sess_no)		
<b>Indices:</b>	NORMAL (2, 15) group_survey_ndx ON (survey)		
	UNIQUE t_group_pk ON (sess_no, group_no)		

### 5.1.4 Table 4: t\_interview

**Comment:** Boat ramp or shellfish harvest survey - interview.

Attributes	Data Type	Null?	Comment
sess_no	longinteger	No	Session number.
group_no	integer	No	Group number or boat number.
fisher_no	integer	No	Fisher number, -1 where the interview is for the combined group eg for the shellfish harvest survey.
combo	character(1,1)	No	A sequential number for each combination of target species, fishing method & location.
fish_zone	smallint		Fishing zone, refer t_zonef_codes and Appendix 4 of the database documentation.
fish_loc	character(3,1)		Fishing location code, refer t_locality_codes.
sub_region	character(2,1)		Sub region - similar to fishing zone, refer to Appendix 3 of the database documentation.
locality	character(40,1)		Fishing locality description.
fish_meth	character(2,1)		Fishing method code, refer t_fishmeth_codes.
meth_type	smallint		Code to identify which fishing method coding used in attr fish_meth
no_rods	integer		Number of hand lines and/or rods used.
no_ll_hooks	integer		Number of Hooks for multi hook line methods.
burley	character(1,1)		Was burley or groundbait used to catch their fish, Y=Yes N=No.
fish_finder	character(1,1)		Did they use a fishfinder to catch their fish, Y=Yes N=No.
target_spp	character(15,1)		List of 3-char codes (separated by commas) for the species targetted, see rdb:curr_spp.
fish_time_s	integer		Fishing time start, in 24-hour hhmm format.
fish_time_f	integer		Fishing time finish, in 24-hour hhmm format.
not_fish_t	integer		Time not fishing, in hhmm format.
hrs_fished	decimal(4,1)		Time spent fishing in decimal hours.
days_per_period	integer		How many days fished in the period in attr f_hist_period, eg days per year.

Attributes	Data Type	Null?	Comment
f_hist_period	integer		Number of days in the time period asked in the question for attr days_per_period.
yearsfished	integer		Approximate number of years they have been fishing for target species and methods stated.
dist	decimal(4,1)		Distance offshore from the mainland of the fishing activity in km.
sex	character(1,1)		Sex of the fisher, M/F.
race	character(1,1)		Racial group of the fisher, codes : E European, M Maori, P Polynesian, A Asian, N Negroid.
age_gp	character(1,1)		Age group, 1=15-20, 2=21-30, 3=31-40, 4=41-50, 5=51-60, 6=61 yrs & over.
fish_diary	character(1,1)		Do they keep a fishing diary, Y or N.
maf_diary	character(1,1)		Do they keep a MAF survey fishing diary, Y or N.
phone	character(1,1)		If the fisher lives in a house that has a telephone
resp_locn	character(30,1)		Where the fishers residence is located.
area	character(4,1)		Area code, refer rdb:area_codes.
region	character(1,1)		Survey base region: N=North, C=Central & South.
survey	character(5,1)		Survey code: 3 chars for region + 2 numerics for yr
comments	text(60,60,60,1)		
id	character(15,1)		Concatenation of : sess_no*boat_no*fisher_no*combo to use as key to join to t_length.
<b>Creator:</b>	smdof		
<b>Referential:</b>	invalid fish_loc (fish_loc) INSERT t_locality_codes (fish_loc) interview pk refer (sess_no, group_no) INSERT t_group (sess_no, group_no) invalid interview fish_meth (fish_meth, meth_type) INSERT t_fishmeth_codes (fish_meth, meth_type) invalid interview fish_zone (fish_zone, survey) INSERT t_zonef_codes (fish_zone, survey)		
<b>Indices:</b>	NORMAL (2, 15) iv_boat_ndx ON (group_no) NORMAL (2, 15) iv_fisher_ndx ON (fisher_no) NORMAL (2, 15) iv_combo_ndx ON (combo) NORMAL (2, 15) iv_zone_ndx ON (fish_zone) NORMAL (2, 15) iv_meth_ndx ON (fish_meth) NORMAL (2, 15) iv_target_ndx ON (target_spp) NORMAL (2, 15) ON (id) UNIQUE t_interview_pk ON (sess_no, group_no, fisher_no, combo)		

### 5.1.5 Table 5: t\_weight

**Comment:** Table containing weights of species caught by shellfish harvesters on a beach

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
sess_no	longinteger	No	Session number
group_no	integer	No	Group number or boat number.
fisher_no	smallint	No	Fisher number.
combo	character(1,1)	No	A sequential number for each combination of target species, fishing method & location.
species	character(3,1)	No	3-char species code, refer rdb:curr_spp.
no_fish	integer		Fish count.
est_wt	decimal(3,1)		Estimated weight (in decimal kg).
agreed_wt	decimal(3,1)		Agreed weight obtained by weighing the catch (in decimal kg).
survey	character(5,1)		Survey code, 3 chars for region + 2 numerics for yr
id	character(15,1)		Concatenation of : sess_no*boat_no*fisher_no*combo to use as a key to join tables.
<b>Creator:</b>	smdof		
<b>Indices:</b>	NORMAL (2, 15) weight_sess_ndx ON (sess_no) UNIQUE weight_pk ON (sess_no, group_no, fisher_no, combo, species)		

### 5.1.6 Table 6: t\_length

**Comment:** Fish lengths from the boat ramp or shellfish harvest survey

Attributes	Data Type	Null?	Comment
sess_no	longinteger	No	Session number.
group_no	integer	No	Group number or boat number.
fisher_no	integer	No	Fisher number.
combo	character(1,1)	No	A sequential number for each combination of target species, fishing method & location.
species	character(3,1)	No	3-char species code, refer rdb:curr_spp.
lgth	decimal(4,1)		Length of the fish (cm) - except for rock lobster(CRA) which is tail width in mm, or shellfish TL in mm
lgth_code	character(1,1)		Precision of length measurement, R = Rounded down to nearest cm, E = Exact to 1 decimal place.
width_meas	integer		Width of the fish (cm) or mm for shellfish. Currently width of OYS (mm)
weight	decimal(7,2)		Fish weight, in decimal kg.
no_fish	integer		Fish count.
observd	character(1,1)		Observed, refer t_observd_codes
meas_meth	character(1,1)		Fish measurement method, refer rdb:t_fish_meas_codes
cpue	character(1,1)		Include in CPUE analysis ? A=Yes, X=No
region	character(1,1)		Survey base region: N=North, C=Central & South.
survey	character(5,1)		Survey code, 3 chars for region + 2 numerics for yr.
id	character(15,1)		Concatenation of : sess_no*boat_no*fisher_no*combo to use as a key to join tables.
<b>Creator:</b>	smdof		
<b>Referential:</b>	invalid species (species) INSERT {/data/db2/rdb,neptune.niwa.cri.nz,rdb} :species_master (code) length pk refer (sess_no, group_no, fisher_no, combo) INSERT t_interview (sess_no, group_no, fisher_no, combo)		
<b>Indices:</b>	NORMAL (2, 15) lgth_survey_ndx ON (survey) NORMAL (2, 15) lgth_sess_ndx ON (sess_no) NORMAL (2, 15) lgth_boat_ndx ON (group_no) NORMAL (2, 15) lgth_fisher_ndx ON (fisher_no) NORMAL (2, 15) lgth_combo_ndx ON (combo) NORMAL (2, 15) lgth_spp_ndx ON (species) NORMAL (2, 15) lgth_id_ndx ON (id)		

### 5.1.7 Table 7: t\_observd\_codes

**Comment:** Descriptions for codes for attr observd in table t\_length

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
observd	character(1,1)	No	Code for the observed status of fish.
descriptn	character(80,1)	No	Description of the observd code.
<b>Creator:</b>	smdof		
<b>Indices:</b>	UNIQUE observd_pk ON (observd)		

### 5.1.8 Table 8: t\_observer

**Comment:** Observations of fishing activity.

Attributes	Data Type	Null?	Comment
sess_no	longinteger	No	Session number.
run_no	smallint	No	Run number which identifies a bunch of observations.
group_no	integer	No	Group number or boat number - identifies a group of fishers.
activity_no	smallint	No	Activity number identifies different fishing activities, e.g. different fishing methods.
start_time	integer		Start time of the run or observation.
run_end_t	integer		Run end time.
rotation	character(1,1)		Direction in which the run of the area was made, C = Clockwise (North to South), A =Anti-clockwise (South to North)
fish_zone	smallint		Fishing zone, refer t_zonef_codes.
fish_loc	character(3,1)		Fishing location code, refer t_locality_codes.
fish_meth	character(2,1)		Fishing method code, refer t_fish_meth_codes.
meth_type	smallint		Code to identify which fishing method coding used in attr fish_meth.
count1	integer		Count of fishing activity specified in count1code.
count1code	character(3,1)		Code to identify what was counted in attr count1, refer t_count_codes.
count2	integer		Count of fishing activity specified in count2code.
count2code	character(3,1)		Code to identify what was counted in attr count2, refer t_count_codes.
count3	integer		Count of fishing activity specified in count3code.
count3code	character(3,1)		Code to identify what was counted in attr count3, refer t_count_codes.
survey	character(5,1)		Survey code: 3 chars for region + 2 numerics for yr
comments	character(80,1)		
<b>Creator:</b>	smdof		
<b>Referential:</b>	t_observer refer (sess_no) INSERT t_session (sess_no)		
<b>Indices:</b>	UNIQUE BTREE t_observer_pk ON (sess_no, run_no, group_no, activity_no)		

### 5.1.9 Table 9: t\_count\_codes

**Comment:** Descriptions of the codes for the count code attributes in table t\_observer

Attributes	Data Type	Null?	Comment
count_code	character(3,1)	No	Code to identify what was counted in attr count1, 2 or 3 in t_observer.
descrptn	character(80,1)	No	Description of the count_code.
<b>Creator:</b>	smdof		
<b>Indices:</b>	UNIQUE count_codes_pk	ON	(count_code)

### 5.1.10 Table 10: t\_ctch\_cen93

**Comment:** Catch details by species from the 1992/93 Central Region boat ramp survey.  
Data were collected in a different format to other surveys and are therefore not in the main t\_length table (see also t\_len\_cen93)

Attributes	Data Type	Null?	Comment
sess_no	longinteger	No	Session number
group_no	integer	No	Fishing group number
fisher_no	integer	No	Fisher number
combo	character(1,1)	No	Combo
species	character(3,1)	No	Species code, refer rdb:species_master
no_fish	integer		Fish count
weight	decimal(7,2)		Fish weight (kg)
observd	character(1,1)		Observed code, refer t_observd_codes
region	character(1,1)		1 char code for survey region. Always C=central
survey	character(5,1)		5 char code for survey. Always CEN93
id	character(15,1)		Concatenation of : sess_no*boat_no*fisher*combo to use as a key to join tables.
<b>Creator:</b>	dba		
<b>Indices:</b>	NORMAL (2, 15) ctch_cen93_species_ndx	ON	(species)

### 5.1.11 Table 11: t\_len\_cen93

**Comment:** Fish lengths from the 1992/93 Central Region boat ramp survey. Data were collected in a different format and are therefore not in the main t\_length table (see also t\_ctch\_cen93)

Attributes	Data Type	Null?	Comment
sess_no	longinteger	No	Session number
group_no	integer	No	Fishing group number
fisher_no	integer	No	Fisher number
combo	character(1,1)	No	Combo
species	character(3,1)	No	Species code, refer rdb:species_master
lgth	integer		Length of the fish (cm) - except for rock lobster (CRA) which is tail width in mm
weight	decimal(7,2)		Fish weight (not used, see t_ctch_cen93)
no_fish	integer		Fish count
observd	character(1,1)		Observed code, refer t_observd_codes
meas_meth	character(1,1)		Fish measurement method, refer rdb:t_fish_meas_codes
cpue	character(1,1)		Include in CPUE analysis ? Always X=no
region	character(1,1)		1 char code for survey region. Always C=central
survey	character(5,1)		5 char code for survey. Always CEN93
id	character(15,1)		Concatenation of : sess_no*boat_no*fisher*combo to use as a key to join tables.
<b>Creator:</b>	dba		
<b>Indices:</b>	NORMAL (2, 15) len_cen93_species_ndx	ON	(species)

## 5.2 Diary survey tables:

### 5.2.1 Table 1: t\_phone

**Comment:** Table for diary survey, telephone or intercept questionnaire.

Attributes	Data Type	Null?	Comment
zone1	smallint		Zone lived in, ie phone book selected from.
resp	integer	No	Respondent number, unique per survey.
fishers	smallint		Fishers in the household? 1=Yes, 2=No.
not15	smallint		Fisher(s) not 15 (yrs old) or older 1=ticked (=Yes)
no_fishers	smallint		Number in household who went fishing in the last 12 months.
no_LE14	smallint		Number of fishers 14 years or younger.
no_commercial	smallint		Number of commercial fishers in the household.
commercial	smallint		Is respondent a commercial fisherman, 1=Yes, 2=No.
trips	smallint		Number of fishing trips in the last 12 months, 1=LT 6, 2=6-15, 3=16-30, 4=30 or more, 5=D.K.
intend	smallint		Think will go saltwater fishing, diving or shellfish gathering in the coming 12 months? 1=Yes 2=No 3=DK For additional codes see Appendix 3 of the database documentation.
SNA10	smallint		In the last 12 months catch a total of more than 10 SNA? 1=Yes, 2=No, 3=Don't Know.
KAH10	smallint		In the last 12 months catch a total of more than 10 KAH? 1=Yes, 2=No, 3=Don't Know.
BCO10	smallint		In the last 12 months catch a total of more than 10 BCO? 1=Yes, 2=No, 3=Don't Know.
meas	smallint		Willing to measure length of SNA, KAH and BCO? 1=Yes, 2=No.
gp_size	smallint		Number of people usually go fishing with: 0=No one else, 1=1, 2=2, 3=3, 4=4, 5=5, 6=6 or more, 7=it varies, 8=Don't Know

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
fish_meths	character(26,1)		2 char codes, comma separated, for the type of fishing method used (refer t_fishmeth_codes).
meth_type	smallint		Code used to identify which fishing method coding series was used (refer t_fishmeth_codes).
sex	smallint		Sex : 1=Male, 2=Female.
age_gp	smallint		Age group : 0=14 years or under, 1=15-20, 2=21-30, 3=31-40, 4=41-50, 5=51-60, 6=61 years or older. For additional codes see Appendix 3 of the database documentation.
ethnic	smallint		Ethnic group : 1=European or Pakeha, 2=NZ Maori, 3=Pacific groups, 4=Other, 5=Asian. For additional codes see Appendix 3 of the database documentation.
fish_club	smallint		Belong to a marine fishing club? 1=Yes, 2=No.
boat_club	smallint		Belong to a marine boating club? 1=Yes, 2=No.
dive_club	smallint		Belong to a diving club? 1=Yes, 2=No.
sca_fish	smallint		Since July this year have dived or dredged for scallops? 1=Yes, 2=No.
sca_dive	integer		Number of scallop diving trips since 15 July this year.
sca_dredge	integer		Number of scallop dredging trips since 15 July this year.
diarist_yn	smallint		Prepared to keep a diary ?, 1=Yes, 2=No.
survey	character(5,1)	No	Survey code, 3 chars for region + 2 numerics for yr
<b>Creator:</b>	smdof		
<b>Indices:</b>	UNIQUE t_phone_pk	ON	(survey, resp)

## 5.2.2 Table 2: t\_sca

**Comment:** Table for supplementary phone questionnaire for scallop fishers in the diary survey. Currently for the Central region only.

Attributes	Data Type	Null?	Comment
resp	integer	No	Unique 4-digit number for each respondent to the survey.
area_sca	character(4,1)	No	Area made trips to for scallops: GLDB = Golden Bay, TASB = Tasman Bay (incl. Croisilles Harbour), PELO = Pelorus Sound, QCSD = Queen Charlotte Sound (incl. Tory Channel), CORO = Coromandel Peninsula, STEW = Stewart Island, ELSW = Elsewhere.
no_trips	smallint		Number of SCA trips to area.
limit	smallint		Number of trips to area caught limit bag of 50 SCA.
avg_ctch	smallint		Average SCA catch this season on trips to area.
survey	character(5,1)	No	Survey code, 3 chars for region + 2 numeric for yr.
<b>Creator:</b>	smdof		
<b>Indices:</b>	UNIQUE t_sca_pk ON (survey, resp, area_sca)		

### 5.2.3 Table 3: t\_response

**Comment:** Table of response status for those considered valid diarists, eg if they went fishing or not etc

Attributes	Data Type	Null?	Comment
key	longinteger	No	Primary key generated from a counter.
zone1	smallint	No	1-digit code to denote the zone the respondent lives in.
resp	longinteger	No	Unique 4-digit number for each respondent to the survey.
year_s	integer		4 digit year of start of the quarter or other time period
month_s	smallint		Month start (range 1-12)
day_s	smallint		Day start
year_f	integer		4 digit year finish
month_f	smallint		Month finish (range 1-12)
day_f	smallint		Day finish
quarter	smallint		quarter of the year (range 1-4)
response	smallint		response status for the quarter or other time period, refer to Appendix 3 of the database documentation for the codes.
weighting	decimal(11,9)		weighting factor, used for scaling up catches.
survey	character(5,1)		Survey code, 3 chars for region + 2 numeric for yr.
<b>Creator:</b>	smdof		
<b>Indices:</b>	PRIMARY KEY BTREE ON (key)		
	UNIQUE t_response_pk ON (resp, survey, year_s, month_s)		
	NORMAL (2, 15) response_survey_ndx ON (survey)		
	NORMAL (2, 15) response_resp_ndx ON (resp)		

## 5.2.4 Table.4: t\_effort

**Comment:** This table contains diarist's data on their effort for one fishing trip as a recreational angler.

Attributes	Data Type	Null?	Comment
trip_no	longinteger	No	Unique sequential for each trip in the survey.
resp	integer		Unique 4-digit number for each respondent to the survey.
resp_status	smallint		Status of diarist:1=fishing; 2=no fishing; 3=no response; 4=withdrew; 5=not included; 6=deceased
quarter	character(1,1)		3 month period of the year.
fish_date	character(8,1)		Date of the fishing trip, format as punched.
trip_date	date(4)		Date of the fishing trip.
zonel	smallint		1-digit code to denote the zone the respondent lives in.
resp_locn	character(30,1)		Where the respondents residence is located.
fish_zone	smallint		2-digit code for the zone fished in during a fishing trip (refer t_zonef_codes and Appendix 4 of the database documentation).
CRAarea	character(1,1) smatch '[A-H]'		Rock Lobster area code, A thru H correspond to QMA's CRA1 thru CRA5, & CRA7 thru 9 respectively.
SCAarea	smallint		Scallop area, refer to Appendix 4 of the database documentation for areas.
fish_loc	character(3,1)		Locality code, for where fished, (refer t_locality_codes).
locality	character(60,1)		Locality name, where fished as recorded by the diarist
qma	smallint		Quota Management Area
hrs	decimal(4,1)		Time (decimal hours) spent fishing during the trip.
ramp	character(3,1)		ramp code for Boat departure point eg ramp or marina, refer t_ramp_codes
target_sp	character(35,1)		List of 3-char codes (separated by commas) for each of the species targetted by the angler during the fishing trip (see rdb:curr_spp).
fish_meth	character(2,1)		2 char code for the type of fishing method used in a fishing trip (refer t_fishmeth_codes)

Attributes	Data Type	Null?	Comment
meth_type	smallint		Code to identify which fishing method coding series was used (refer t_fishmeth_codes)
boat	smallint		1-digit code for type of boat used in a fishing trip, refer to Appendix 3 of the database documentation.
group_size	smallint		Number of people in the fishing group
survey	character(5,1)	No	Survey code, 3 chars for region + 2 numerics for yr refer t_survey_codes.
comments	character(70,1)		
<b>Creator:</b>	dba		
<b>Referential:</b>	INVALID BOAT CODES (boat) INSERT t_boat_codes (boat) INVALID FISH_LOC (fish_loc) INSERT t_locality_codes (fish_loc) INVALID RAMP (ramp) INSERT t_ramp_codes (ramp) INVALID SURVEY (survey) INSERT t_survey_codes (survey) INVALID FISH_ZONE (fish_zone, survey) INSERT t_zonef_codes (fish_zone, survey) INVALID FISH METH (fish_meth, meth_type) INSERT t_fishmeth_codes (fish_meth, meth_type)		
<b>Indices:</b>	UNIQUE effort_idx ON (trip_no) NORMAL (2, 15) eff_resp_idx ON (resp) NORMAL (2, 15) eff_zonl_idx ON (zonel) NORMAL (2, 15) eff_zonf_idx ON (fish_zone) NORMAL (2, 15) eff_gear_idx ON (fish_meth) NORMAL (2, 15) eff_boat_idx ON (boat) NORMAL (2, 15) eff_target_idx ON (target_sp) NORMAL (2, 15) eff_survey_idx ON (survey) NORMAL (2, 15) eff_date_idx ON (trip_date)		

### 5.2.5 Table 5: t\_catch

**Comment:** This table contains diarist's data on the catch from a fishing trip.

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
trip_no	longinteger	No	Unique sequential for each trip in the survey.
species	character(3,1)	No	3-char code for species caught, refer rdb:curr_spp.
no_caught	integer		Number of the species caught during the trip.
weight	decimal(4,1)		Weight (decimal kg) of the species caught.
survey	character(5,1)	No	Survey code, 3 chars for region + 2 numerics for yr

**Creator:** dba

**Referential:** NO SUCH TRIP (trip\_no) INSERT t\_effort (trip\_no)  
t\_catch invalid species (species) INSERT  
{/data/db2/rdb,neptune.niwa.cri.nz,rdb} :species\_master  
(code)

**Indices:** NORMAL (2, 15) ctch\_spp\_idx ON (species)  
NORMAL (2, 15) ctch\_survey\_ndx ON (survey)  
UNIQUE ctch\_idx ON (trip\_no, species)

### 5.2.6 Table 6: t\_lgth

Comment: Diarist's fish length measurements.

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
trip_no	longinteger		Trip number.
resp	longinteger	No	Respondent number.
trip_date	date(4)		Date of the fishing trip.
species	character(3,1)	No	3-char species code, refer rdb:curr_spp.
lgth	integer	No	Length of the fish in cm.
sex	character(1,1)		Sex code: 1=Male, 2=Female.
no_fish	integer		Number of fish.
survey	character(5,1)	No	Survey code, 3 chars for region + 2 numerics for yr
<b>Creator:</b>	smdof		
<b>Indices:</b>	NORMAL (2, 15) lgth_date_ndx ON (trip_date)		
	NORMAL (2, 15) lgth_resp_ndx ON (resp)		

## 5.3 Shared code tables:

### 5.3.1 Table 1: t\_survey\_codes

**Comment:** Descriptions and codes used to identify the various surveys.

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
survey	character(5,1)	No	Survey code: 3 chars for region + 2 numerics for year.
proj_code	character(12,1)		Ministry of Fisheries Project code for the project that collected the data.
descrptn	character(95,1)		Description of the survey.
comments	text(60,120,60,1)		
<b>Creator:</b>	smdof		
<b>Indices:</b>	UNIQUE survey_pk ON (survey)		

### 5.3.2 Table 2: t\_zonef\_codes

**Comment:** This table contains the codes and descriptions for the zone fished in during a fishing trip.

<b>Attributes</b>	<b>Data Type</b>	<b>Null?</b>	<b>Comment</b>
fish_zone	smallint	No	2-digit code for the zone fished in during a fishing trip.
survey	character(5,1)		Survey code, 3 chars for region + 2 numerics for yr
descrptn	character(80,1)		Description of the code.
<b>Creator:</b>	dba		
<b>Indices:</b>	UNIQUE zonef_ndx ON (fish_zone, survey)		
	NORMAL (2, 15) zfcode_ndx ON (fish_zone)		

### 5.3.3 Table 3: t\_locality\_codes

**Comment:** Codes for locality name of place fished by 1996 diarist or northern ramp survey fisher.

Attributes	Data Type	Null?	Comment
fish_loc	character(3,1)	No	3 char code for locality fished
fish_zone	smallint		Zone number 1 to 40 as used by 1996 National Diary survey
descrptn	character(80,1)		Description - Geographical name that the fish_loc derived from (followed by definition of the area).
<b>Creator:</b>	smdof		
<b>Indices:</b>	UNIQUE locality ndx ON (fish_loc)		

### 5.3.4 Table 4: t\_fishmeth\_codes

**Comment:** This table contains the codes and descriptions for the types of fishing methods used during a fishing trip.

Attributes	Data Type	Null?	Comment
fish_meth	character(2,1)	No	2-digit code for the type of fishing method used in a fishing trip.
meth_type	smallint		Code to identify which fishing method coding used.
descrptn	character(80,1)		Description of the code.
<b>Creator:</b>	dba		
<b>Indices:</b>	UNIQUE fishmeth_codes_pk ON (meth_type, fish_meth)		

### 5.3.5 Table 5: t\_ramp\_codes

**Comment:** Boat ramp codes for diary and boat ramp surveys

Attributes	Data Type	Null?	Comment
ramp	character(3,1)	No	2 or 3 char boat ramp code (2 char codes as used by Northern [Auckland] boat ramp survey, also called Interview location code on boat ramp forms.
fish_zone	smallint		Fishing zone as used in the 1996 National Diary survey
descrptn	character(80,1)		Description ie ramp name as recorded by the diarist or boat ramp interviewer
<b>Creator:</b>	smdof		
<b>Indices:</b>	UNIQUE t_rmp_code_pk ON (ramp)		

### 5.3.6 Table 6: t\_boat\_codes

**Comment:** This table contains the codes and descriptions for the types of boats used during a fishing trip.

Attributes	Data Type	Null?	Comment
boat	smallint		1-digit code for the type of boat used in a fishing trip, as used in t_effort.boat.
group_type	character(1,1)		1 character code for the type of boat or group as used in t_group.group_type.
descrptn	character(80,1)		Description of the code.
<b>Creator:</b>	dba		

## 6 **rec\_data business rules**

### 6.1 **Introduction to business rules**

The following are a list of business rules applying to the **rec\_data** database. A business rule is a written statement specifying what the information system must do or how it must be structured. In this instance the information system is any system that is designed to handle recreational fishing data.

There are three recognised types of business rules:

<b>Fact</b>	Certainty or an existence in the information system.
<b>Formula</b>	Calculation employed in the information system.
<b>Validation</b>	Constraint on a value in the information system.

Fact rules are shown on the ERD by the cardinality; e.g., one-to-many, of table relationships. Formula and Validation rules are implemented by referential constraints, range checks, and algorithms both in the database and during validation.

Validation rules may be part of the preloading checks on the data as opposed to constraints or checks imposed by the database. These rules sometimes state that a value should be within a certain range. All such rules containing the word 'should' are conducted by preloading software. The use of the word 'should' in relation to these validation checks means that a warning message is generated when a value falls outside this range and the data are then checked further in relation to this value.

## 6.2 Summary of rules

### Boat ramp session details (t\_session)

<b>sess_no</b>	Session number must be unique.
<b>ramp</b>	Code for a ramp or beach. Must be a valid code as listed in <i>t_ramp_codes</i> .
<b>sess_date</b>	Session date must be a valid date, within a reasonable range for the survey, as listed in Appendix 3.
<b>sess_time_s</b>	Session start time must be a valid 24-hour time and fall within the range of 0 – 2359 hours.
<b>sess_time_f</b>	Session finish time must be a valid 24-hour time and fall within the range of 0 – 2359 hours.
<b>t_code</b>	Must be a valid code, as listed in Appendix 3.
<b>iv_type</b>	Interview type must be a valid code as listed in Appendix 3.
<b>platform_type</b>	Must be a valid code as listed in Appendix 3.
<b>day_type</b>	Must be a valid code, as listed in Appendix 3.
<b>trailer_s</b>	The number of trailers should fall within the reasonable range of 0 – 200.
<b>trailer_m</b>	The number of trailers should fall within the reasonable range of 0 – 200.
<b>trailer_f</b>	The number of trailers should fall within the reasonable range of 0 – 200.
<b>boat_not_iv</b>	The number of boats not interviewed should fall within the reasonable range of 0 – 40.
<b>low_tide</b>	The time of low tide must be a valid 24 hour time and fall within the range of 0 – 2359 hours.
<b>high_tide</b>	The time of high tide must be a valid 24 hour time and fall within the range of 0 – 2359 hours.
<b>swell_ht</b>	The swell height must be a number greater than or equal to zero.
<b>sea_state</b>	Must be a valid code as listed in Appendix 3.
<b>rain</b>	Must be a valid code as listed in Appendix 3.
<b>overhead</b>	Overhead conditions must be a valid code as listed in Appendix 3.
<b>wind_speed</b>	Must be a valid code as listed in Appendix 3.

- wind\_dirn** Must be a valid code as listed in Appendix 3.
- wind\_knots** Wind speed in knots should be within a reasonable range of 0 to 59.
- moon** The moon phase code must be an integer greater than zero.
- region** Survey base region must be a valid code of N or C
- sess\_type** The session type must be a valid code as listed in Appendix 3.
- survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

**Count of shellfish harvest fishers (t\_fisher\_count)**

- sess\_no** Session number must be equal to a session number in t\_session.
- hr** Time of count must have a value and be a valid 24-hour time and fall within the range of 0 – 2359 hours.
- fish\_loc** Must have a value and be an integer greater than zero.

**Multiple column checks on session number, time and spatial strata:**  
 The values in the sess\_no, hr and fish\_loc attributes must be a unique combination.

- no\_pickers** The number of fishers should fall within the reasonable range of 0 – 99.
- survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

### **Boat or shellfish harvest group details (t\_group)**

- sess\_no** Session number must be equal to a session number in *t\_session*.
- group\_no** Must be a unique number within a single session.
- group\_type** Should be a valid code as listed in the *t\_boat\_codes* table.
- outcome** Interviewed or not etc code must be a valid code as listed in Appendix 3.
- time\_i** Time of intercept must be a valid 24-hour time and fall within the range of 0 – 2359.

#### **Multiple column checks on time of intercept, session start time and session finish time:**

The time of intercept must be between the session start and session finish times.

- no\_fishers** The number of fishers must be an integer greater than or equal to zero.
- no\_male** The number of male fishers must be an integer greater than or equal to zero.
- no\_female** The number of female fishers must be an integer greater than or equal to zero.

#### **Multiple column checks on no\_fishers, no\_male and no\_female:**

The number of male and female fishers must not exceed no\_fishers

- region** Survey base region must be a valid code of N or C
- survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

## Shore side interview eg boat ramp (t\_interview)

### Multiple column checks on session number and group number:

The combination of session number and group number must exist in the *t\_group* table.

**fisher\_no** The fisher number must have a number; either -1 or an integer greater than zero.

**combo** The combo attribute must have a value.

### Multiple column checks on session number, group number, fisher number and combo:

The values in the *sess\_no*, *group\_no*, *fisher\_no* and *combo* attributes must be a unique combination.

**fish\_zone** The fishing zone should be a valid code as listed in *t\_zonef\_codes* for that survey.

**sub\_region** Must be a valid *sub\_region* as listed in Appendix 3.

**fish\_loc** The fishing locality code must be a valid code as listed in *t\_locality\_codes*.

**fish\_meth** The fishing method code must be in the table *t\_fishmeth\_codes* for that *meth\_type*.

**no\_rods** The number of lines used must be an integer greater than zero and should be within a reasonable range of 1 - 9.

**no\_ll\_hooks** The number of hooks recorded must be an integer greater than zero and should be within a reasonable range of 5 - 99.

**burley** The code indicating if ground bait was used should be either 'Y' or 'N'.

**fish\_finder** The code indicating if a fish-finder was used should be either 'Y' or 'N'.

**target\_spp** Each of the listed species codes must be a valid code as listed in the *curr\_spp* table in the **rdb** database.

**fish\_time\_s** Fishing start time must be a valid 24-hour time and fall within the range of 0– 2359.

**fish\_time\_f** Fishing finish time must be a valid 24-hour time and fall within the range of 0 – 2359.

**not\_fish\_t** Time not fishing must be a valid 24-hour time and should fall within the reasonable range of 0 - 1200.

**Multiple column checks on fishing time:**

The fishing start time must not be greater than the fishing finish time.  
The not fishing time must be less than the difference between the fishing finish time and the fishing start time.

**hrs\_fished** Hours spent fishing must be a positive value and should be within a reasonable range of 0.1 - 24.0.

**days\_per\_period** The days fished in the period must be an integer greater than zero.

**f\_hist\_period** The number of days must be an integer greater than zero.

**Multiple column checks on days fished in the fishing history time period:**

The number of days\_per\_period must not be greater than the f\_hist\_period.

**yearsfished** The number of years fishing must be a positive value and fall within a reasonable range of 0 to 90.

**sex** The value for sex must equal 'M' or 'F'.

**race** The code for race must be a valid value; i.e., one of : E, M, P, A, N.

**age\_gp** The age group code must be a valid code as listed in Appendix 3.

**fish\_diary** The code indicating if they kept a fishing diary must be either 'Y' or 'N'.

**maf\_diary** The code indicating if they kept a MAF fishing diary must be either 'Y' or 'N'.

**phone** Code to indicate if their house has a telephone, must be either 'Y' or 'N'.

**area** The area code must be a valid code as listed in the *area\_codes* table of the **rdb** database.

**region** The survey base region code must be a valid code of either 'N' or 'C'.

**survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

### Catch weights for shellfish harvest (t\_weight)

**Multiple column checks on session number, group number, fisher number and combo:**

The combination of session number, group number, fisher number and combo must exist in the *t\_interview* table, and must be a unique combination.

- species** Must be a valid species code as listed in the *curr\_spp* table of the **rdb** database.
- no\_fish** The number of fish must be an integer greater than zero and should fall within the reasonable range of 1 – 400.
- est\_wt** The estimated weight must a positive value within reasonable limits (0 – 99 kg)
- agreed\_wt** The value obtained by weighing the catch must a positive value within reasonable limits (0 – 99 kg)
- survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

### Fish length from boat ramp type surveys (t\_length)

**Multiple column checks on session number, group number, fisher number and combo:**

The combination of session number, group number, fisher number and combo must exist in the *t\_interview* table, and must be a unique combination.

- species** Must be a valid species code as listed in the *curr\_spp* table of the **rdb** database.
- lgth** The fish length should fall within reasonable limits of 5 – 350.
- weight** The fish weight should fall within the reasonable range of 0.05 to 150 kg.
- no\_fish** The number of fish must be an integer greater than zero and should fall within the reasonable range of 1 – 400.
- observd** The observed code must be a valid code as listed in *t\_observd\_codes*.
- meas\_meth** The fish measurement method must be a valid code as listed in the table *t\_fish\_meas\_codes* of the **rdb** database.
- cpue** Flag to include in CPUE analysis must be either ‘A’ or ‘X’.
- region** The survey base region code must be a valid code of either ‘N’ or ‘C’.
- survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

### **Observed status codes (t\_observd\_codes)**

**observd**      The observed code must be a valid code as listed in Appendix 3.

### **Observer counts (t\_observer)**

**sess\_no**      Session number must be equal to a session number in t\_session.

**run\_no**      The run number must be an integer greater than zero and be unique within a session.

**group\_no**     The group number should be an integer greater than zero.

**Multiple column checks on session number, run number, group number, and activity number:**

The values in the sess\_no, run\_no, group\_no and activity\_no attributes must be a unique combination.

**run\_start\_t**   The run start time must be a valid 24-hour time and fall within the range of 0 – 2359.

**run\_end\_t**    The run end time must be a valid 24-hour time and fall within the range of 0 – 2359.

**Multiple column checks on run\_start\_t and run\_end\_t :**

**The run end time should be greater than the run start time**

**rotation**     Code for the direction of the run must be a valid code of A or C, for Anticlockwise or Clockwise respectively.

**fish\_zone**    The fishing zone should be a valid code as listed in *t\_zonef\_codes* for that survey.

**fish\_loc**      The fishing locality code must be a valid code as listed in *t\_locality\_codes*.

**fish\_meth**    The fishing method code must be in the table *t\_fishmeth\_codes* for that meth\_type .

**count1 etc**    The counts of fishing activity must be an integer greater than zero.

**count code**   The codes to identify what was counted must be a valid code as listed in *t\_count\_codes*.

### Diary survey intercept (t\_phone)

<b>zonal</b>	Zone lived in must be a valid code as listed in Appendix 3.
<b>resp</b>	Respondent number must be unique within each survey.
<b>fishers</b>	If there are fishers in the household must be a valid code in the range 1 – 2.
<b>not15</b>	If the fisher(s) are LE 14 the valid code is 1 (for Yes).
<b>no_fishers</b>	The number of fishers should fall within the reasonable range of 0 – 10.
<b>no_LE14</b>	The number of fishers less than or equal to 14 years old should fall within the reasonable range of 0 – 8.
<b>no_commercial</b>	The number of commercial fishers should fall within the reasonable range of 0 – 10.
<b>commercial</b>	Code to indicate if they are a commercial fisher must be an integer in the range 1 – 2.
<b>trips</b>	The number of fishing trips must be a valid code in the range 1 – 5.
<b>intend</b>	Intend going fishing code must be a valid code as listed in Appendix 3.
<b>SNA10</b>	Snapper catch code must be a valid code in the range 1 – 3.
<b>KAH10</b>	Kahawai catch code must be a valid code in the range 1 – 3.
<b>BCO10</b>	Blue cod catch code must be a valid code in the range 1 – 3.
<b>meas</b>	Willing to measure fish lengths code must be a valid code in the range 1 – 2.
<b>gp_size</b>	Fishing group size must be a valid code in the range 1 – 8.
<b>fish_meths</b>	The fishing method codes must be valid codes as listed in the <i>t_fishmeth_codes</i> table.
<b>meth_type</b>	Fishing method type code must be valid codes as listed in the <i>t_fishmeth_codes</i> table.
<b>sex</b>	Sex code must be a valid code in the range 1 – 2.
<b>age_gp</b>	The age group code must be a valid code as listed in Appendix 3.
<b>ethnic</b>	The code for ethnic group must be a valid code as listed in Appendix 3.
<b>fish_club</b>	Belong to a fishing club code must be a valid code in the range 1 to 2 (for Y or N).

<b>boat_club</b>	Belong to a boating club code must be a valid code in the range 1 to 2 (for Y or N).
<b>dive_club</b>	Belong to a diving club code must be a valid code in the range 1 to 2 (for Y or N).
<b>sca_fish</b>	Fished for scallops code must be a valid code in the range 1 to 2 (for Y or N).
<b>sca_dive</b>	Number of scallop dive trips should fall within the reasonable range of 0 – 20.
<b>sca_dredge</b>	Number of scallop dredge trips should fall within the reasonable range of 0 – 30.
<b>diarist_yn</b>	Prepared to keep a diary must be a valid code in the range 1 to 2 (for Y or N).
<b>survey</b>	Survey code must be a valid code as listed in the <i>t_survey_codes</i> table.

#### **Central region scallop fishers survey (t\_sca)**

<b>resp</b>	The respondent number must be equal to a resp number in <i>t_phone</i> .
<b>area_sca</b>	Must be a valid scallop area as listed in Appendix 4.
	<b>Multiple column checks on respondent and scallop area:</b> The scallop area must be a unique code for a single respondent.
<b>no_trips</b>	The number of trips should fall within the reasonable range of 1 – 39.
<b>limit</b>	The number of trips should fall within the reasonable range of 0 – 39.
<b>avg_ctch</b>	The average catch should fall within the reasonable range of 0 – 100.
<b>survey</b>	Survey code must be a valid code as listed in the <i>t_survey_codes</i> table.

**Multiple column checks on respondent number, scallop area and survey:**  
The values in the resp, SCAarea and survey attributes must be a unique combination.

**Diarists response status (t\_response)**

- key**        The key must be a unique number.
- zonal**     Zone lived in must be a valid code as listed in Appendix 3.
- resp**      Respondent number must be unique within each survey.
- year\_s**    Year start must be a valid year and should fall within a reasonable range for the survey as listed in Appendix 3.
- month\_s**   Month start must be an integer representing a valid month (1-12).
- day\_s**     Day start must be an integer representing a valid day.
- quarter**   Must be an integer in the range 1-4.
- response**   The response status must be a valid code as listed in Appendix 3.
- survey**    Survey code must be a valid code as listed in the *t\_survey\_codes* table.

**Multiple column checks on respondent number, year start, month start and survey:**

The values in the survey, resp, year\_s and month\_s attributes should be a unique combination.

### **Diarist's fishing effort (t\_effort)**

- trip\_no** Trip number, must be unique.
- resp** The diarist respondent number must be an integer greater than zero.
- resp\_status** Must be in the range of 1 – 6.
- trip\_date** The date of the trip must be a valid date within reasonable bounds for the survey as listed in Appendix 3.
- zonal** The zone lived in code must be a valid code as listed in Appendix 3.
- fish\_zone** The fishing zone code must be a valid code as listed in the *t\_zonef\_codes* table.
- CRAarea** The rock lobster area code must be in the range A – H.
- SCAarea** The scallop area code must be in the range A – I.
- fish\_loc** The fishing locality code must be a valid code as listed in the *t\_locality\_codes* table.
- qma** The quota management area fished must be within the range of 1-5, 7-9.
- hrs** The fishing time should be within a reasonable range of 0.1 – 120.
- ramp** The code for the boat departure point must be a valid code as listed in the *t\_ramp\_codes* table.
- target\_sp** Each of the listed species codes must be a valid code as listed in the *curr\_spp* table in the **rdb** database.
- fish\_meth** The fishing method code must be a valid code as listed in the *t\_fishmeth\_codes* table.
- meth\_type** The fishing method type must be a valid code as listed in the *t\_fishmeth\_codes* table.
- boat** The boat type code must be a valid code and fall within the range of 1 – 5 as listed in Appendix 3
- group\_size** The number of people in the fishing group should fall within the reasonable range of 1 – 40.
- survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

#### **Multiple column checks on survey and respondent number:**

The combination of respondent and survey must exist in the table *t\_phone*.

### **Diarists catch details (t\_catch)**

- trip\_no** The trip number must be equal to a trip number as listed in the *t\_effort* table.
- species** Must be a valid species code as listed in the *curr\_spp* table of the **rdb** database.
- no\_caught** The number of fish caught should fall within the reasonable range of 1 – 750.
- weight** The weight of fish caught should fall within the reasonable range of 0.1 – 150.
- survey** Survey code must be a valid code as listed in the *t\_survey\_codes* table.

#### **Multiple column checks on trip number and species:**

The values in the *trip\_no* and *species* attributes must be a unique combination.

### **Diarists fish lengths (t\_lgth)**

- trip\_no** The trip number should be equal to a trip number as listed in the *t\_catch* table.
- resp** The respondent number must be equal to a respondent number in the *t\_effort* table.
- trip\_date** The date of the fishing trip must be a valid date.
- species** Must be a valid species code as listed in the *curr\_spp* table of the **rdb** database.
- lgth** The length of the fish should fall within the reasonable range of 5 – 200.
- no\_fish** The number of fish should fall within the reasonable range of 1 – 50.

## 7 Acknowledgments

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## 8 References

NB: The references below include details on the method used for the respective surveys and include examples of the forms used to record the data.

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## **Appendix 1 - Data entry, error checking, and loading**

The data in **rec\_data** have come from various sources. The database was created in 1996, and holds data from earlier surveys, currently back to 1991. These earlier data were supplied in electronic form and are assumed to be checked by researchers working with the data at the time. Other research providers under contract to the Ministry of Fisheries are still supplying data. These data are not all subject to the same level of checking by NIWA, as would be expected if NIWA was supplied with the raw data and was responsible for the data entry and checking of these data.

This section outlines the flow of paper recorded data, for recreational fishing data from collection through to its availability to researchers for analysis, and defines the separate tasks that are required to do this.

In this example, interviewers at boat ramps collect hand written data. These data are recorded on paper forms. Each session is identified by it's ramp code, session date, and if more than 1 session that day, by it's time of day code. This session will later be assigned an unique number by the checking and formatting software prior to loading to the database.

### **1. Pre-key punching, visual checking and batching:**

At the completion of each session the interviewer should ensure that all pages are in order, and that all required data fields have been correctly filled out. The data are then forwarded to a project team member who checks the above, and forwards the data to key punching.

### **2. Key punching data entry:**

At this point, trained data entry operators key-punch the data from the collated forms to a digitised fixed format ASCII file format on computer by keyboard entry. NIWA uses the KEYS Data Emulator for data entry.

All data entry is verified, that is, each page of data is key punched twice and the two results are cross-checked for mismatches. Any data entry operator errors are corrected at this point.

The digitised data files are transferred for error checking along with the original raw data file. At this point the data are now ready for error checking and formatting routines.

### **3. Data error checking, validation, and grooming:**

Data files are put through a number of computer error checking (validation) routines that look for inaccuracies and inconsistencies within sessions. Any errors detected are corrected. Data are then passed through these error-checking routines until the data reach a satisfactory standard that will allow them to be inserted in the appropriate database tables.

The data are usually inserted into "working tables" in a database. This is done to check the integrity of the data by taking advantage of relational databases ability to manipulate, match and compare related sets of data.

4. **“Groomed”, validated data loaded to database. Available for analysis:**

The clean, groomed, and validated data are inserted into the appropriate database and now become available for analysis.

The clean digitised data files and raw paper data are then archived for safekeeping.

## Appendix 2 - Empress Datatypes

Empress supports many datatypes. They are listed below along with their parameters.

- 1) Character      CHAR (length, type)  
                    length - maximum number of characters  
                    type - may be one of (1-3)  
  
                    1 - printable characters only, leading and trailing blanks removed  
  
                    TEXT (print length, primary storage, overflow storage, number of extents)
- 2) Date            DATE (format)  
                    format - may be one of (0-8)  
  
                    0 - 19820627  
                    1 - 27 June 1982  
                    2 - June 27, 1982  
                    3 - 06/27/82  
                    4 - 27/06/82  
                    5 - 27 Jun 82  
                    6 - Jun 27, 82  
                    7 - 06/27/1982  
                    8 - 27/06/1982  
  
                    TIME (format-see DATE above) hh:mm:ss
- 3) Decimal        DECIMAL (maximum digits, number of decimal places)  
  
                    DOLLAR (maximum size, format)  
                    format - may be one of (1-3)  
  
                    1 - \$1,234.00  
                    2 - \$\*\*\*\*1,234.00  
                    3 - 1234.00
- 4) Float          FLOAT - 4-byte float: scientific notation  
  
                    LONGFLOAT - 8-byte float: scientific notation
- 5) Integer        SHORTINTEGER - 1-byte integer  
                    (-127 to 127)  
  
                    INTEGER - 2-byte integer  
                    (-32767 to 32767)  
  
                    LONGINTEGER - 4-byte integer  
                    (-2147483647 to 2147483647)

## Appendix 3 - Reference Documentation - Code Tables

The following tables document the codes used for various attributes in the **rec\_data** database.  
NB That code lists longer than approximately 1 page that are documented in a table of this database are not listed in this appendix.

### *survey codes*

#### Diary surveys

<i>survey</i>	Description	
SOU92	South region diary survey	1 Sep 91 - 31 Aug 92
SOU93	South region diary survey (continuation / variability survey of SOU92)	1 Sep 92 - 31 Aug 93
CEN93	Central region diary survey	1 Dec 92 - 30 Nov 93
CEN94	Central region linking survey (continuation / variability survey of CEN93)	1 Dec 93 - 30 Nov 94
NOR94	North region diary survey	1 Dec 93 - 30 Nov 94
JBL96	National 1996 diary survey 1st quarter data punched by John Bell & Associates	
NAT96	National diary survey	1 Jan 96 - 31 Dec 96
NAT97	National diary survey (continuation / variability survey of NAT96)	1 Jan 97 - 31 Dec 97
PAT93	Paterson Inlet (Stewart Is) diary survey	1 Dec 93 - 28 Feb 98
AKA97	Akaroa Harbour diary survey	Dec 96 - Apr 98
WLG99	Wellington area diary survey	Jan 99 - 30 Apr 00
MBS99	Greater Marlborough Sounds	Jan 99 - 30 Apr 00
KAI99	Kaikoura area diary survey	Dec 98 - Sep 99
BLF98	Bluff Harbour	1 Apr 98 – 31 Mar 99
OTG98	Otago Harbour	1 Apr 98 – 31 Mar 99
NAT00	National diary survey (additional data collected in phone survey not in this database, see database comments or marlin metadatabase)	1 Dec 99 – 30 Nov 00
NAT01	National diary survey	1 Dec 00 – 30 Nov 01

#### Boat ramp surveys

NOR91	North region boat ramp survey	Nov 90 - Jul 91
NOR94	North region boat ramp survey and Aerial sightings observer survey	Jan 94 - Jun 94
NOR98	North region boat ramp survey (only at a small number of ramps)	Dec 97 – Dec 98
NOR01	North region boat ramp survey targeting Kahawai catches	Jan 01 – Apr 01
CEN93	Central region boat ramp survey	Dec 92 - Apr 93
NAT96	National boat ramp survey	Dec 95 - Jan 97
KAI99	Kaikoura area boat ramp and Roving observer survey	Dec 98 – Jan 99

Boat ramp surveys continued

<i>survey</i>	Description	
MAK00	Maketu Taiapure fishing survey	1999 - 2001
NAT00	National boatramp survey	2000
TGB04	Tasman and Golden Bays boatramp survey of scallop and oyster catches	Sep 2003 to Feb 2004

Shellfish Harvest surveys

NSH98	North region Shellfish Harvest survey	Dec 97 – Dec 98
-------	---------------------------------------	-----------------

NB For the regional diary surveys e.g. Otago & Bluff, the start & end dates are not rigidly defined. Some respondents may get their diaries weeks before others, and others may send in final trips late, including trips after the official end date.

**Time of day codes by survey - (*t\_code*)**

Survey	<i>t_code</i>	Description	Main Survey	Pilot survey
NOR91	N	Morning	07:00-10:00	
NOR91	M	Mid-day	10:00-14:00	08:30-12:30
NOR91	A	Afternoon	14:00-18:00	12:30-17:00
NOR91	E	Evening	18:00-21:00	17:00-21:00
NOR94	D	Dawn	Before 11:00	
NOR94	M	Midday	11:00-15:00	
NOR94	A	Afternoon	15:00-19:00	
NOR94	E	Evening	After 19:00	
NAT96	A	10:00 - 12:00		
NAT96	B	12:00 - 14:00		
NAT96	C	14:00 - 16:00		
NAT96	D	16:00 - 18:00		
NAT96	E	18:00 - 20:00		
NAT96	F	20:00 - 22:00		

NB For the NOR91 survey the first phase termed the pilot survey was primarily from 26 December 1990 to late January 1991, while the second phase termed the main survey was mainly from late February 1991 through until early June 1991.

For other surveys, generally coding was simplified so for the first session of each day, *t\_code* had a value of A, the second B etc, or 1 & 2 etc respectively.

t\_session attributes.

**Day type** (*day\_type*)

- 1 Weekend or Public holiday
- 2 Weekday
- 3 Contest (eg Furuno Contest in the NORth region surveys)

**Interview type** (*iv\_type*)

- 1 Ramp
- 2 Beach
- 3 Roving boat
- 4 Other
- 5 Marina
- 6 Fixed (observer)
- 7 Roving (observer)

**Platform type** (*platform\_type*)

- A Aeroplane
- B Boat
- L Land

**Session type** (*sess\_type*)

- I Interview
- O Observer

**Environmental data**

**Sea conditions** (*sea\_state*)

- 1 Smooth (0.1 - 0.5)
- 2 Slight (0.5 - 1.0)
- 3 Moderate (1.0 - 2.5)
- 4 Rough (2.5 - 4.0)

**Rain** (*rain*)

- 1 Nil
- 2 Light continuous
- 3 Light scattered
- 4 Medium scattered
- 5 Heavy rain (added April 2004)

**Overhead conditions** (*overhead*)

- 1 Sunny continuous
- 2 Mainly sunny
- 3 Mainly cloudy
- 4 Continuously cloudy

**Wind speed** (*wind\_speed*)

- 1 Nil
- 2 Light (1-10 kts)
- 3 Medium (11-20 kts)
- 4 Strong (21 + kts)

**Wind direction** (*wind\_dirn*) in table *t\_session*

- 1 Nil (no wind)
- 2 Variable
- 3 North
- 4 South
- 5 North East
- 6 South West
- 7 East
- 8 West
- 9 South East
- 10 North West

**Intercept Outcome Codes** (*outcome*) in table *t\_group*

- I Interviewed
- R Refused
- Z Incomplete interview for surfcasting mainly
- N Not interviewed
- O Other (boat skiing, picnicking etc)
- X Interviewed but invalid for CPUE analysis
- F Fishing but not willing to be interviewed,  
In TGB04 survey means fishing but not for scallops or oysters

**Sub-region (*sub\_region*) in table *t\_interview***

<i>sub_region</i>	Description	Location Codes ( <i>fish_loc</i> )
B	Bay of Islands	BLA KER RAW RUS BRT
BR	<i>Barrier Islands (diary zone)</i>	
C	Coromandel East	KUA MEB MEI SHO WMM
D	Dargaville Coast	GKG HKG MBF
ES	<i>Eastern Gulf (diary zone)</i>	
E	East Cape (Tarawera River-Te Kaha)	MAT WHA HAU OPO TEK
F	Far North (Houhora - Takau Bay)	HOU GRV RNU KAR MGN TAU CAV TAK
FR	<i>Firth of Thames (diary zone)</i>	
G	General (no area given)	
H	Hokianga Harbour	HKH
I	Inner Gulf	WAI RAN MOT
IN	<i>Inner Gulf (diary zone)</i>	
K	Kaipara Harbour	HEL PTO DAR
KW	Kawhia Harbour	KWH
M	Manukau Harbour	MAN PPK PUR WAK WAR
MD	Mid Gulf	OMA KAW TIR TAM NOI COR FIR MID
MR	Muriwai-Waikato Coast	BET MUR PIH WKU
N	Ninety Mile Beach	APR BLF NMB WPP
NP	New Plymouth Coast	NPL OKR WTR
O	Outer Gulf	LIT PAK COL MOK GRE FIT ARI BAR NEE
OH	Ohiwa Harbour	OHI
P	Bay of Plenty Coast (Waihi - Tarawera River)	FIV MAK MII PAP
PI	BOP offshore islands	ALD CUV MAY WHI
R	Raglan Harbour	RLN
RL	Raglan Coast (Aotea H. included)	AOT ASS CRY MKP GAN KPP PNU
T	Tutukaka Coast	OAK TUT PKI BRE HEN
TP	The Top (Northland)	REI NOR GEB
TG	Tauranga Harbour	KAT TEP
W	Whangarei Harbour	WEI
WG	Wanganui Coast	RTN WNG WVW
WS	<i>Western Gulf (diary zone)</i>	
WA	Whangaroa Harbour	WGA

### **Age group (*age\_gp*)**

For the CEN93 and NOR94 surveys in the boat ramp interviews one fisher from each boat was asked which of the following age group categories he/she was in.

<i>age_gp</i>	age in years
1	15-20
2	21-30
3	31-40
4	41-50
5	51-60
6	61 years and over.

The NOR94 survey also has many records coded to 'Z' (presumably for not asked). These codes are the same as used in the *age\_gp* attribute in the table *t\_phone* for the diary surveys.

The NOR00 and NOR01 surveys used a different age grouping for the *age\_gp* attribute in table *t\_phone* below.

<i>age_gp</i>	age
20	Refused
21	15-17 yrs
22	18-19 yrs
23	20-24 yrs
24	25-29 yrs
25	30-34 yrs
26	35-39 yrs
27	40-44 yrs
28	45-49 yrs
29	50-54 yrs
30	55-59 yrs
31	60-64 yrs
32	65-69 yrs
33	70-74 yrs
34	75 plus
35	under 15

Ethnic group (*ethnic*) in table *t\_phone*

<i>ethnic</i>	
1	European or pakeha
2	NZ Maori
3	Pacific groups
4	Other

Until 2003 the above codes were used for the attribute *ethnic* in table *t\_phone*. The NOR00 and NOR01 surveys asked the ethnicity question differently by asking which ethnic group **or groups** they belong to. The NOR00 and NOR01 surveys used the following additional codes for the attribute *ethnic*.

*ethnic*

5	Asian
11	Not Answered
12	
13	Maori/Caucasian
14	Maori/Pacific
15	Maori/Asian
16	Maori/Caucasian/Pacific
17	Maori/Caucasian/Asian
18	Maori/Pacific/Asian
19	Maori/Pacific/Asian/Caucasian
20	Caucasian/Pacific
21	Caucasian/Asian
22	Caucasian/Pacific/Asian
23	Pacific/Asian

***t\_length* observed codes (*obsrvd*) from *t\_obsrvd\_codes***

<i>obsrvd</i>	Description
1	measured
2	counted
3	observed
4	not observed
5	head removed (for otoliths)
F	fish filleted (including headed fish)
B	fish used for bait
L	thrown back - legal size (dead or alive)
U	thrown back - under size, dead
R	returned fish
X	sex = female (for CRA)
Y	sex = male (for CRA)

***t\_length* Fish measurement method codes (*meas\_meth*)  
from *rdb:t\_fish\_meas\_codes***

<i>meas_meth</i>	Description
1	Fork Length
2	Total Length
3	Pelvic Length (rays)
4	Shell Length
W	Tail width as legally defined for red rock lobsters

***t\_boat\_codes* re: *t\_effort.boat* & *t\_group.group\_type***

<i>boat</i>	<i>group_type</i>	Description
1	C	Charter
2	Y	Yacht
3	L	Motor Launch
4	T	Trailer-dinghy (excluding yachts)
5		Other
	M	Maori hui permit
	S	Shore fishing
.	R	Snorkelling from rocks (added for NAT00 survey)

The above list includes all records from the table *t\_boat\_codes*.

**count\_codes from *t\_observer***

Codes used for the attributes *count1\_code*, *count2\_code* and *count3\_code* in table *t\_observer*

<i>count_code</i>	description
FSR	Fishers or Group size, the number of people actively fishing in the boat/party.
TBT	TrailerBoats - ie the number of trailer boats with people fishing.
LCH	Launches - ie the number of launches with people fishing.
YCH	Yachts - ie the number of yachts with people fishing.

The above list includes all the codes from the table *t\_count\_codes*, which document the meaning of the attributes *count1*, *count2* and *count3* in the table *t\_observer*.

**Response status for diary surveys (*response*) from *t\_response***

<i>response</i>	Description
0	Did not fish the time period; i.e., the quarter
1	Made trips; i.e., went fishing
4	Have been contacted but no return
7	Either a diarist was not yet recruited or no longer a part of the survey due to design structure. Added for NAT01 survey
6	Can't be contacted (2 x 6's => 8)
8	Dropped from the survey
9	No records available (equivalent to null)

*t\_effort zone lived in (zonal) by survey*

**survey = NAT96 & NAT97**

*zonal* Telephone directory  
- area of residence

- 1 Northland
- 2 Auckland
- 3 Bay of Plenty
- 4 Waikato
- 5 Gisborne
- 6 Hawkes Bay
- 7 Wanganui
- 8 Taranaki
- 9 Manawatu
- 10 Wairarapa
- 11 Wellington
- 12 Marlborough
- 13 Nelson
- 14 West Coast
- 15 Christchurch
- 16 Timaru – Oamaru
- 17 Otago
- 18 Southland

**survey = NOR94**

*zonal* Telephone directory  
- area of residence

- 1 Northland
- 2 Auckland
- 3 Waikato
- 4 Bay of Plenty

**survey = NAT00 & NAT01**

*zonal* Telephone directory  
- area of residence

- 1 Northland
- 2 Auckland
- 3 Waikato
- 4 Bay of Plenty
- 5 Gisborne
- 6 Hawkes Bay
- 7 Taranaki
- 8 Manawatu / Wanganui
- 9 Wellington
- 10 Nelson /Marlborough/Tasman
- 11 West Coast
- 12 Canterbury
- 13 Otago
- 14 Southland

## South region survey<sup>10</sup>

zonal Description

- 1 Clarence Mouth – Conway Mouth
- 2 Conway Mouth – Sumner Beach
- 3 Sumner Beach – Rakaia Mouth
- 4 Rakaia Mouth – Waitaki Mouth
- 5 Waitaki Mouth – Toko Mouth
- 6 Toko Mouth – Slope Point
- 7 Slope Point – Te Waewae Point
- 8 Stewart Island
- 9 Te Waewae Point – Awarua Point

## Central region survey<sup>11</sup>

zonal Description

- 1 Cape Runaway – Whareongaonga
- 2 Whareongaonga – Cape Turnagain
- 3 Cape Turnagain – Turakirae Head
- 4 Turakirae Head – Otaki River
- 5 Otaki River – Waitotara River
- 6 Waitotara River – Tirua Point
- 7 Clarence River – Stephens Island
- 8 Stephens Island – Kahurangi Point
- 9 Kahurangi Point – Awarua Point

NB That the definitions of *the zonal* codes for the South and Central regions correspond to the definitions for the *fish\_zone* codes (see also *t\_zonef\_codes*).

Intend to go fishing in the next 12 months, *intend* in the t\_phone table

*intend*

- 1 Yes
- 2 No
- 3 Don't Know

*intend*

- 4 Definitely go                      The NOR00 and NOR01 surveys
- 5 Probably go                        added codes 4- 8 to *intend*.
- 6 Possibly go
- 7 Probably not go
- 8 Definitely not go

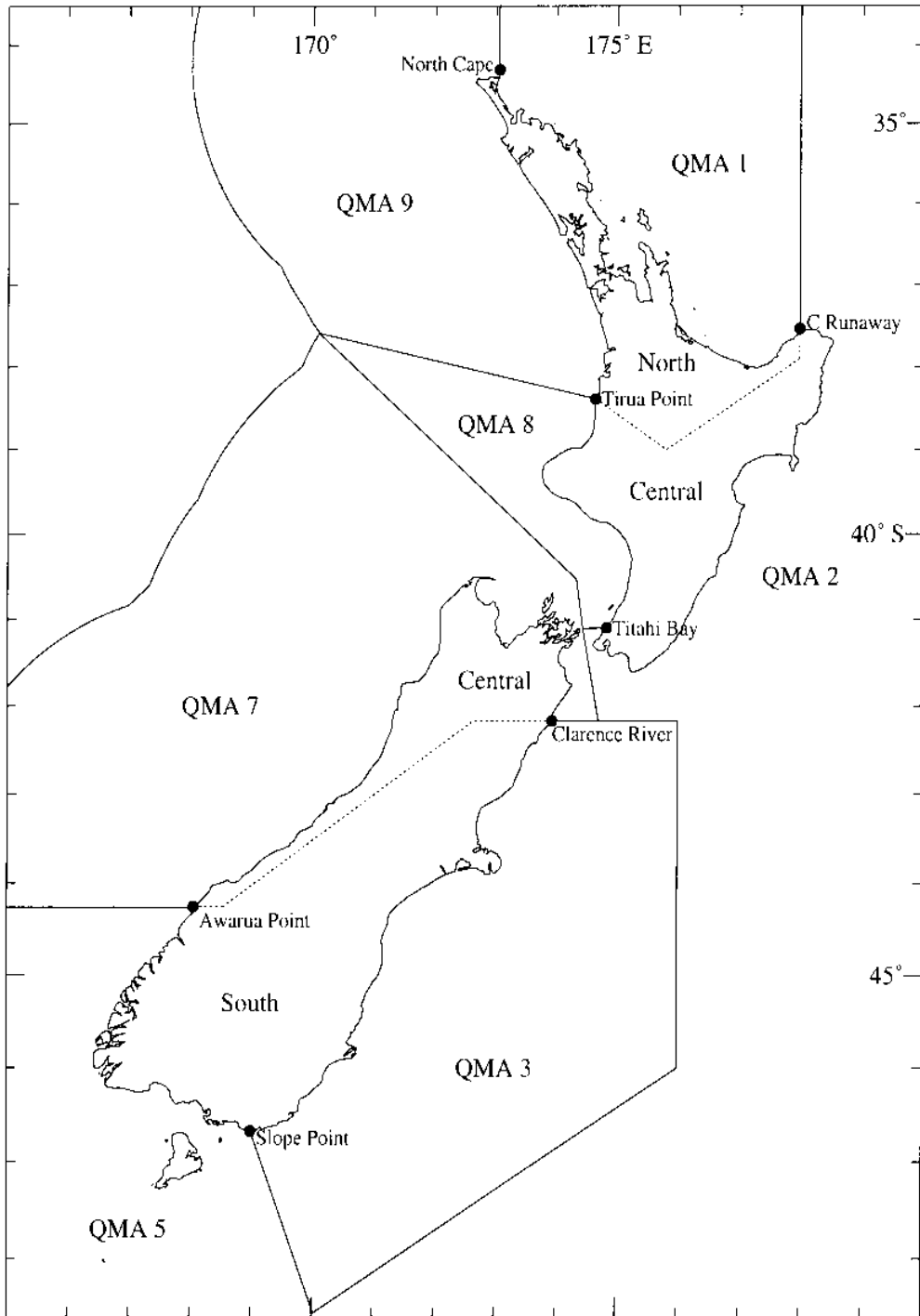
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<sup>10</sup> South region *survey* codes are SOU92 & SOU93

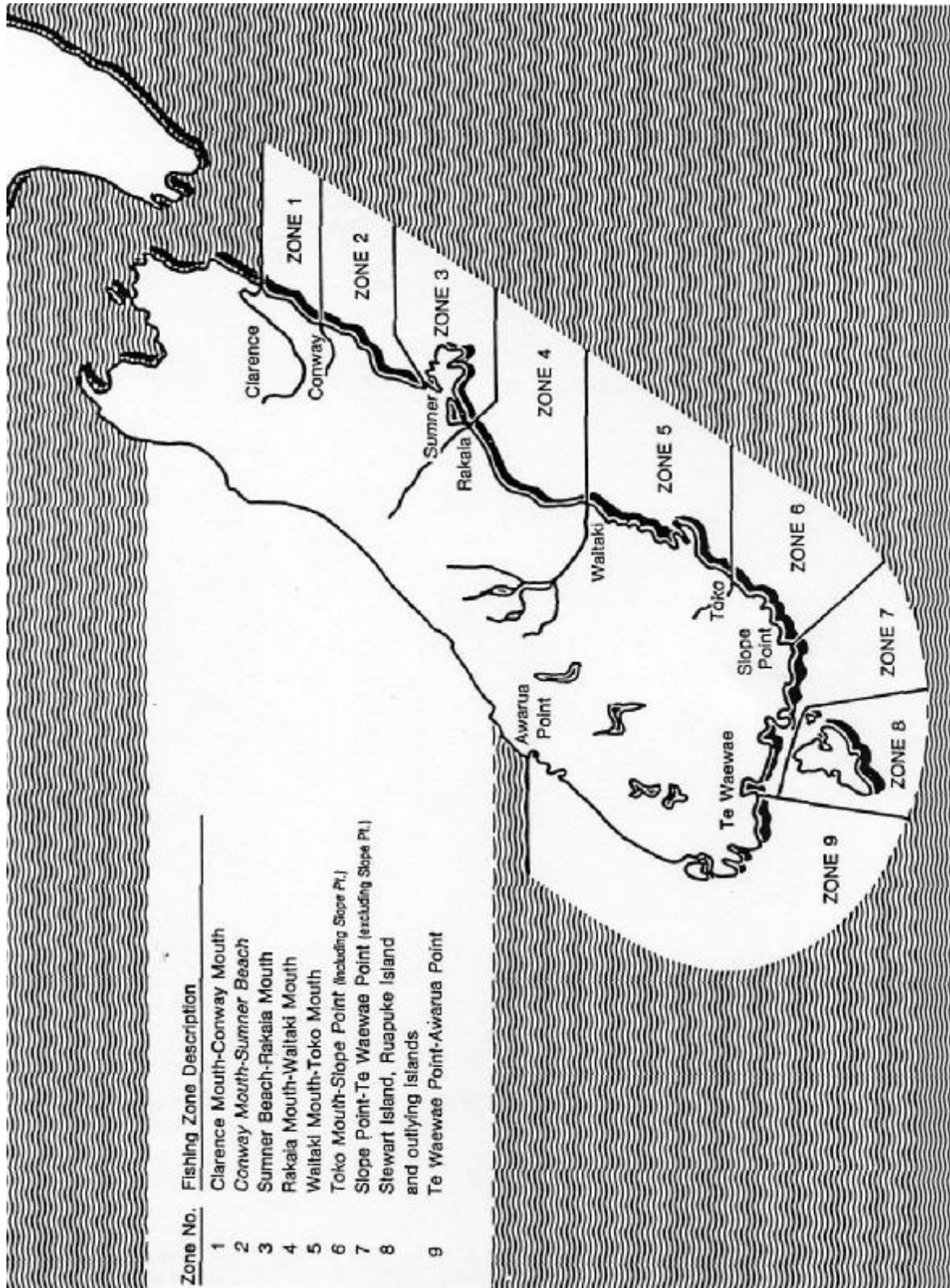
<sup>11</sup> Central region *survey* codes are CEN93 & CEN94

## **Appendix 4 - Reference Documentation - Area Maps**

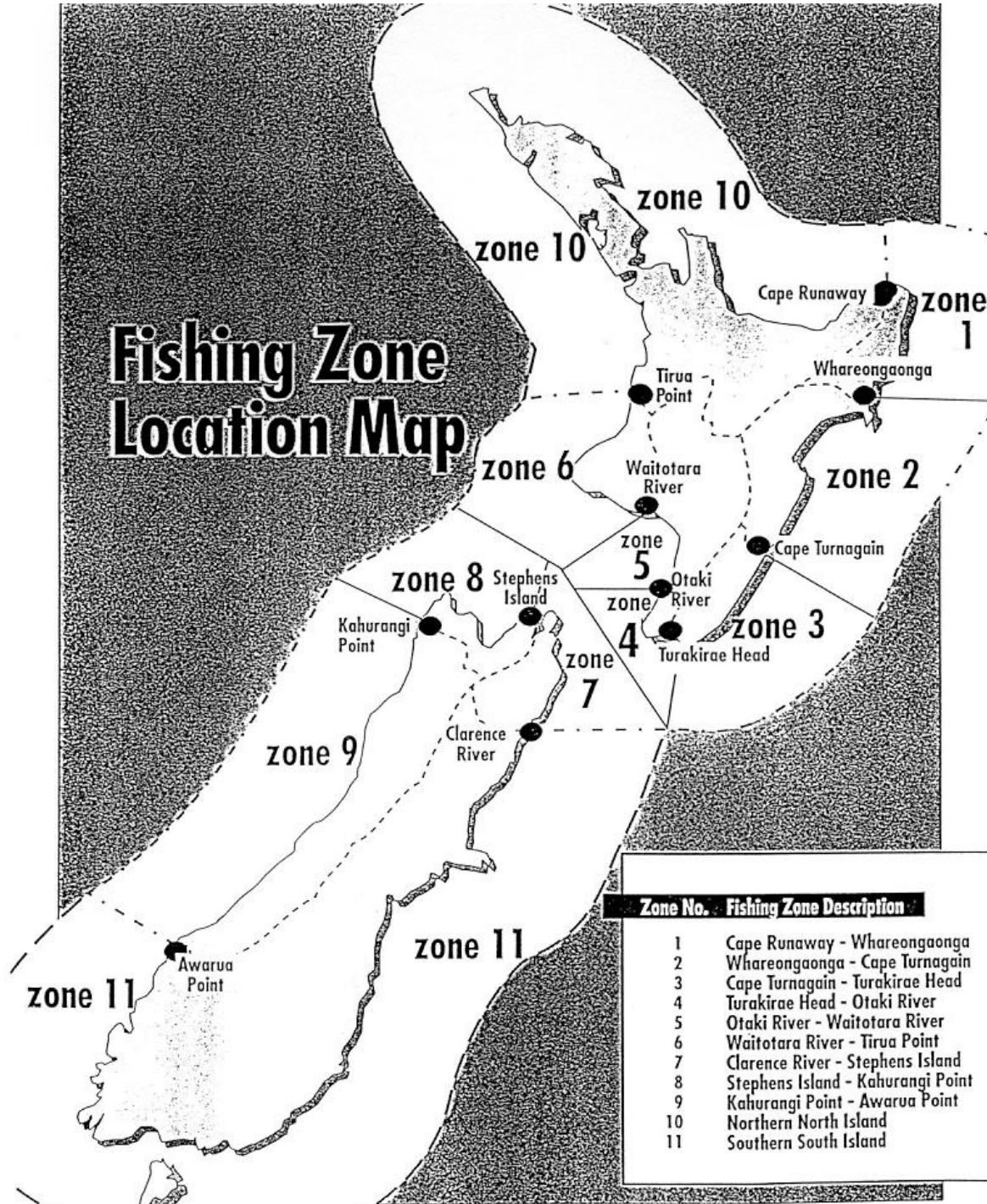
The following maps document the *fish\_zone* attribute unless specified otherwise.



Map of New Zealand showing the land areas taken to be associated with the North, Central, and South regions, and the Quota Management Areas (QMAs) which adjoin the coastline. Refer attribute *qma* in table *t\_effort*.

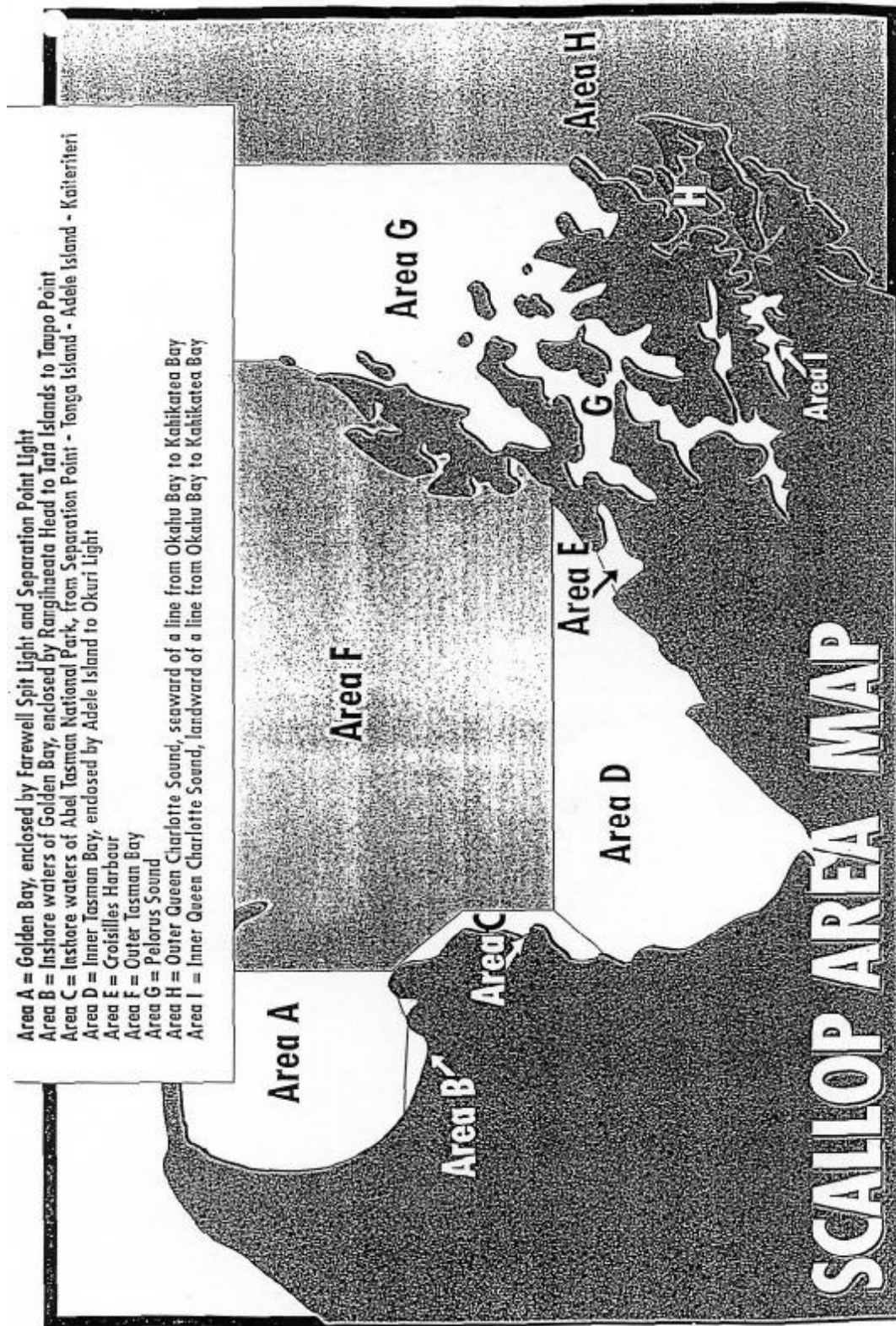


Recreational fishing survey zones used for the South region survey with *survey* codes **SOU92** & **SOU93**



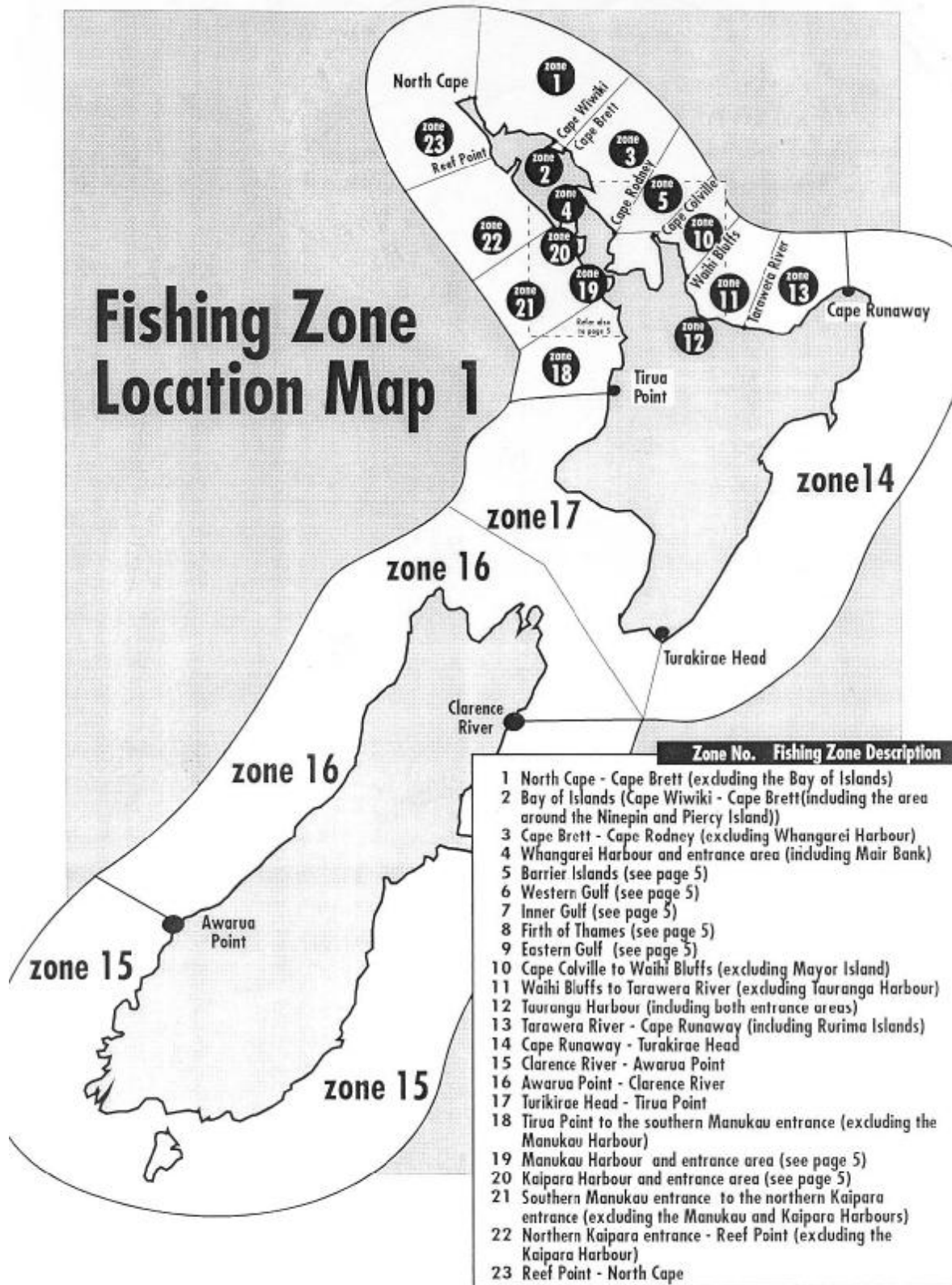
N B. Scallop Fishers, refer also to page 4

Recreational fishing survey zones used for the Central region survey with survey codes CEN94 & CEN94



SCALLOP FISHERS: Please record the letter of the Area you fished in.  
 If you fished outside of Areas A to I please write in the name of the place.

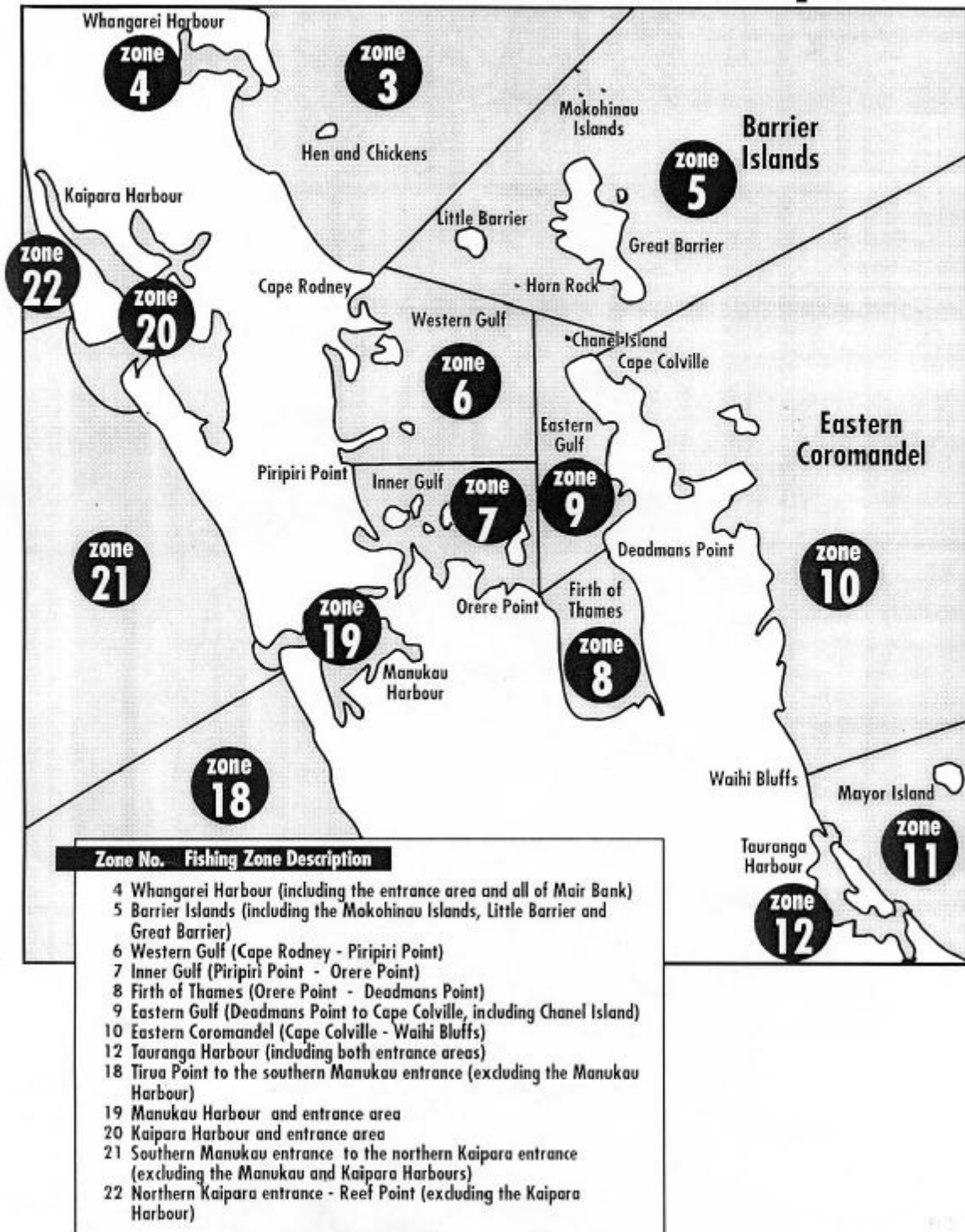
Recreational fishing survey scallop areas used for the Central region survey  
 These codes are used in the attribute *SCAarea* in the table *t\_effort* and apply to the surveys with *survey* codes **CEN93** & **CEN94**  
 NB These areas A through I have been recoded to 1 through 9 respectively in this database.



Refer also to page 5 for the boundaries of the fishing zones between Whangarei and Tauranga

Recreational fishing survey zones used for the North region survey with survey code NOR94

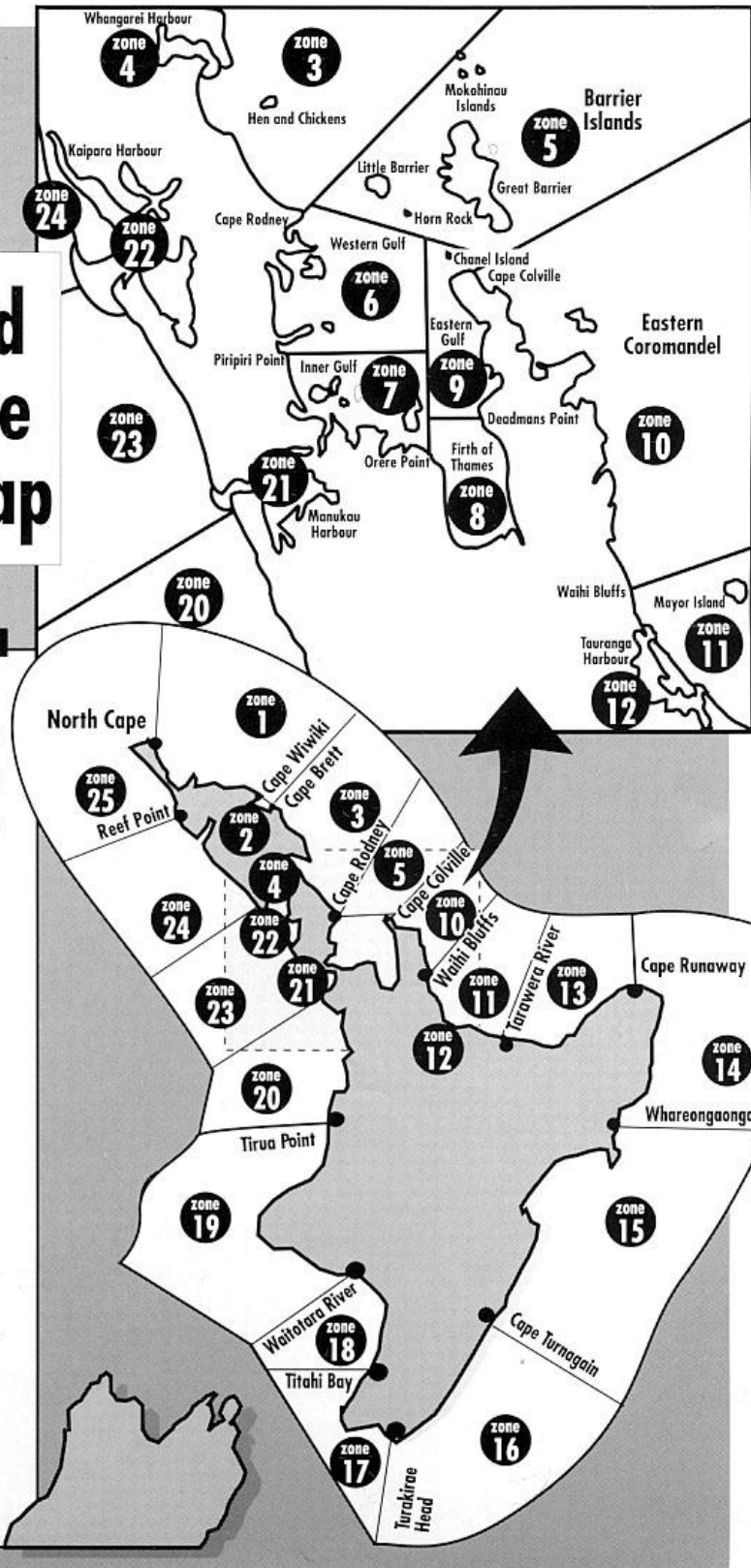
# Fishing Zone Location Map 2



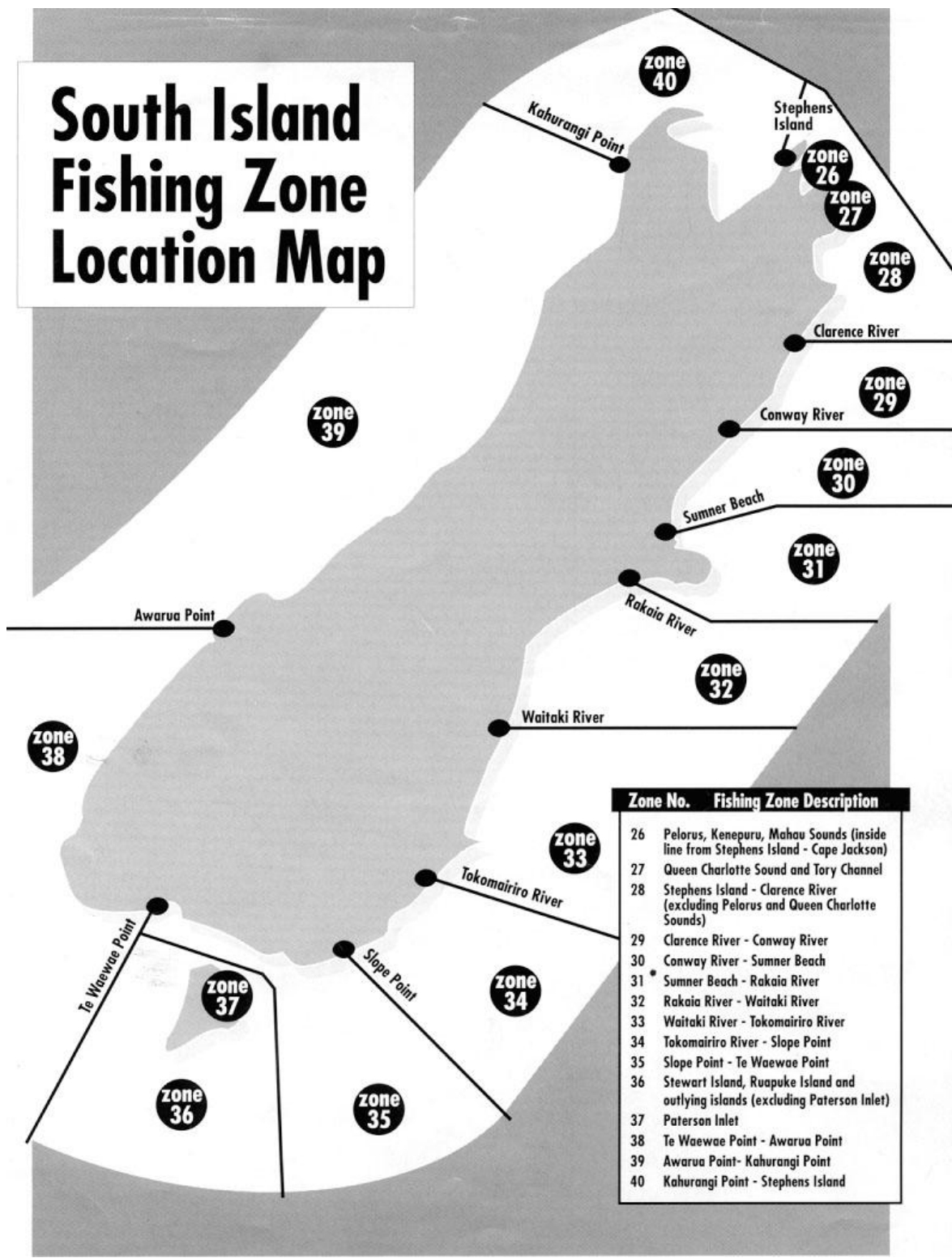
Recreational fishing survey zones used for the North region survey with *survey code* NOR94

# North Island Fishing Zone Location Map

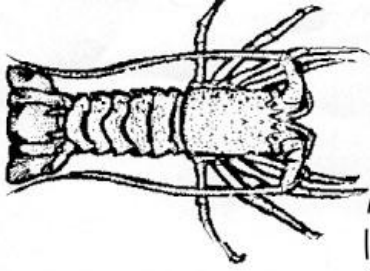
Zone No.	Fishing Zone Description
1	North Cape - Cape Brett (excluding the Bay of Islands)
2	Bay of Islands (Cape Wiwiki - Cape Brett including the area around the Ninepin and Piercy Island)
3	Cape Brett - Cape Rodney (excluding Whangarei Harbour)
4	Whangarei Harbour and entrance area (including Mair Bank)
5	Barrier Islands (including the Mokohinau Islands, Little Barrier and Great Barrier)
6	Western Gulf (Cape Rodney - Piripiri Point)
7	Inner Gulf (Piripiri Point - Orere Point)
8	Firth of Thames (Orere Point - Deadmans Point)
9	Eastern Gulf (Deadmans Point to Cape Colville, including Chanel Island)
10	Eastern Coromandel (Cape Colville to Waihi Bluffs, excluding Mayor Island)
11	Waihi Bluffs to Tarawera River (excluding Tauranga Harbour)
12	Tauranga Harbour (including both entrance areas)
13	Tarawera River - Cape Runaway (including Rurima Islands)
14	Cape Runaway - Whareongaonga
15	Whareongaonga - Cape Turnagain
16	Cape Turnagain - Turakirae Head
17	Turakirae Head - Titahi Bay
18	Titahi Bay - Waitotara River
19	Waitotara River - Tirua Point
20	Tirua Point - entrance area of Manukau Harbour
21	Manukau Harbour and entrance area
22	Kaipara Harbour and entrance area
23	Southern Manukau entrance to the northern Kaipara entrance (excluding the Manukau and Kaipara Harbours)
24	Northern Kaipara entrance - Reef Point (excluding the Kaipara Harbour)
25	Reef Point - North Cape



Recreational fishing survey zones used for the national surveys, with *survey codes* NAT96, NAT97, NAT00, NAT01.

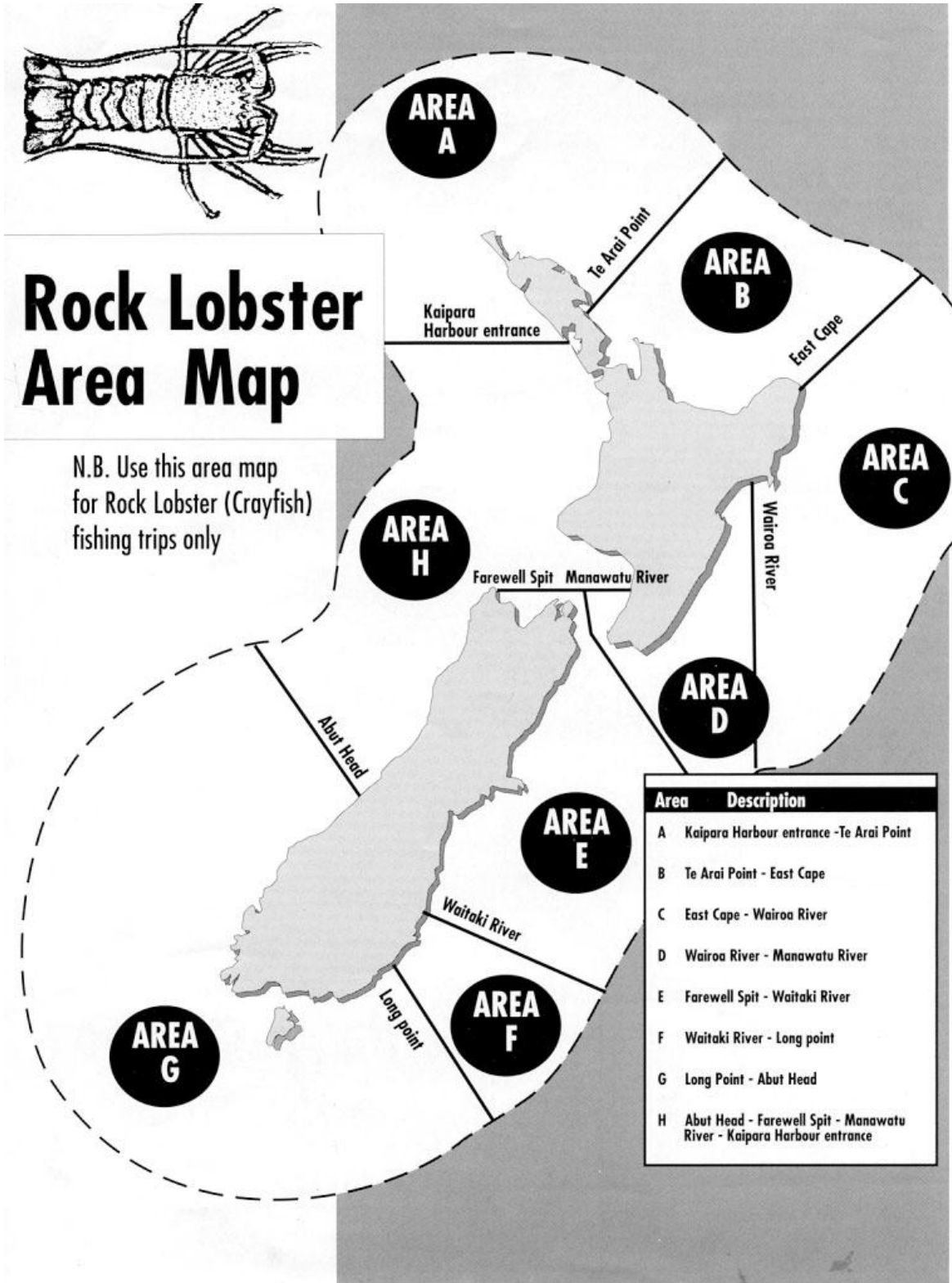


Recreational fishing survey zones used for the national surveys, with survey codes NAT96, NAT97, NAT00 & NAT01



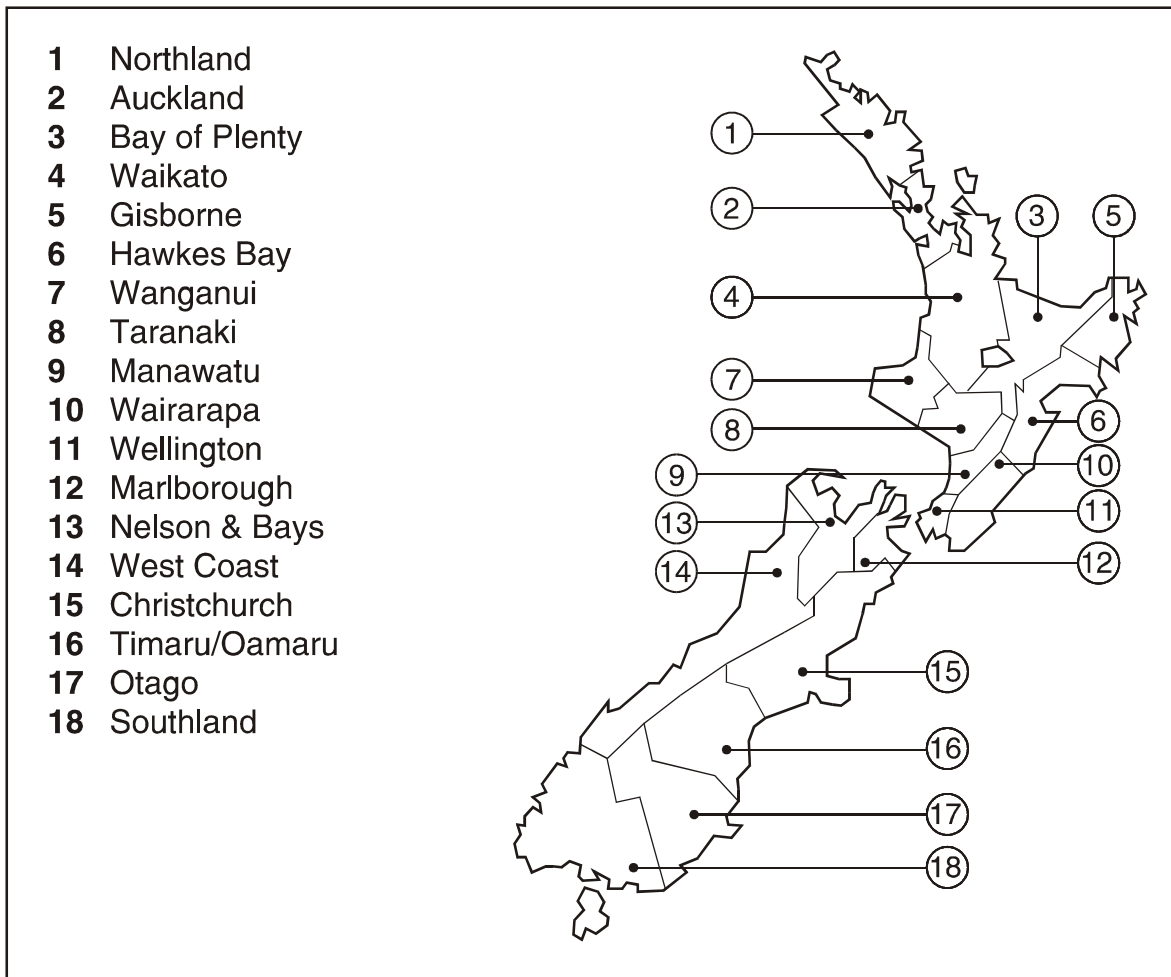
# Rock Lobster Area Map

N.B. Use this area map for Rock Lobster (Crayfish) fishing trips only

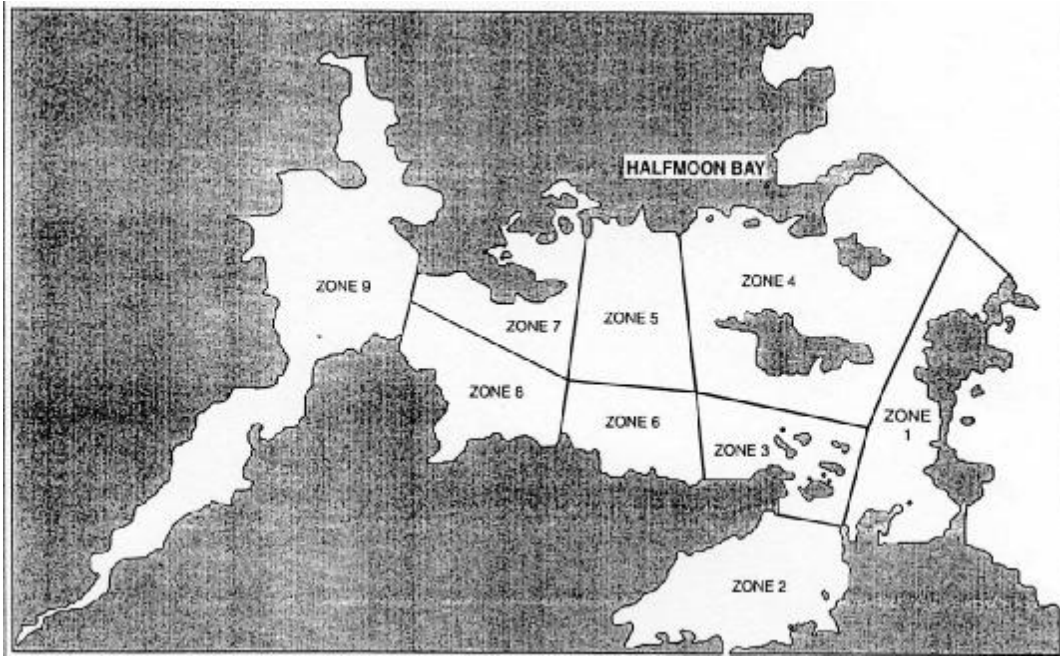


Area	Description
A	Kaipara Harbour entrance - Te Arai Point
B	Te Arai Point - East Cape
C	East Cape - Wairoa River
D	Wairoa River - Manawatu River
E	Farewell Spit - Waitaki River
F	Waitaki River - Long point
G	Long Point - Abut Head
H	Abut Head - Farewell Spit - Manawatu River - Kaipara Harbour entrance

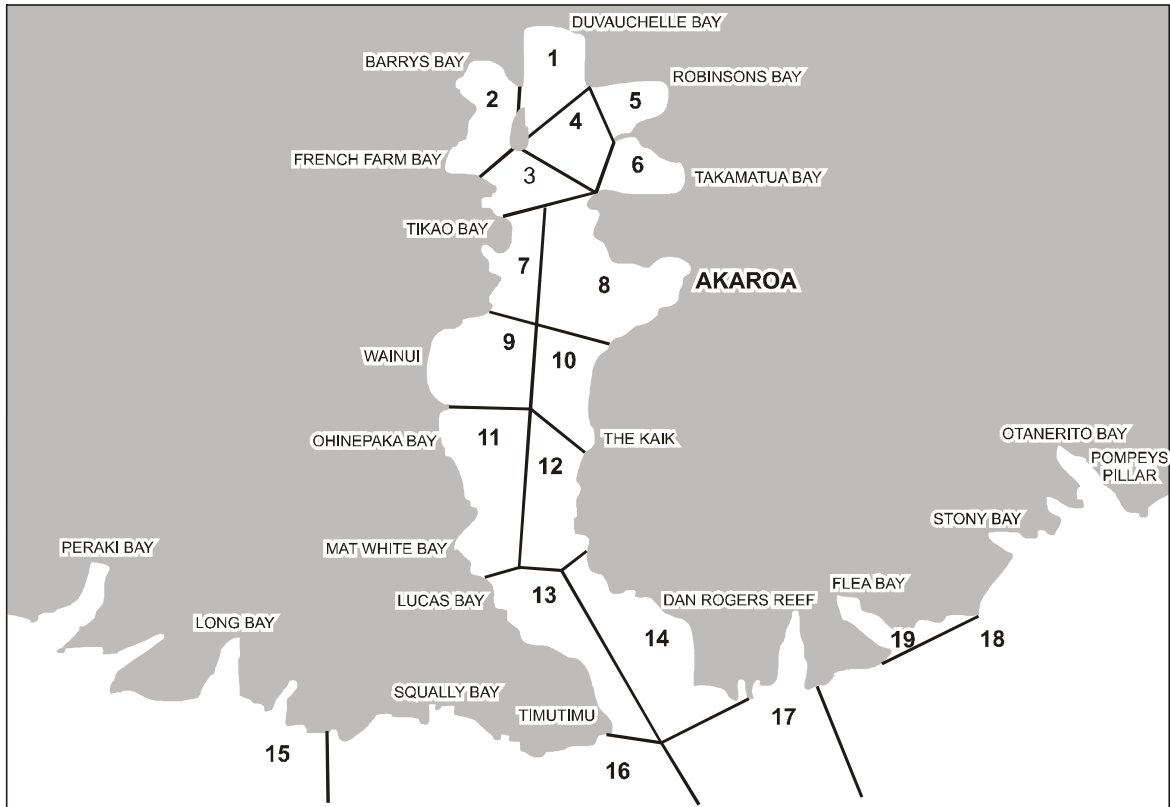
Rock Lobster areas used for the national surveys in attribute CRAarea.



The Telecom telephone book coverage areas and their numbers as used in the NAT96 diary survey. The numbers are those as used in the attribute *zonel* in tables *t\_phone* and *t\_effort*.



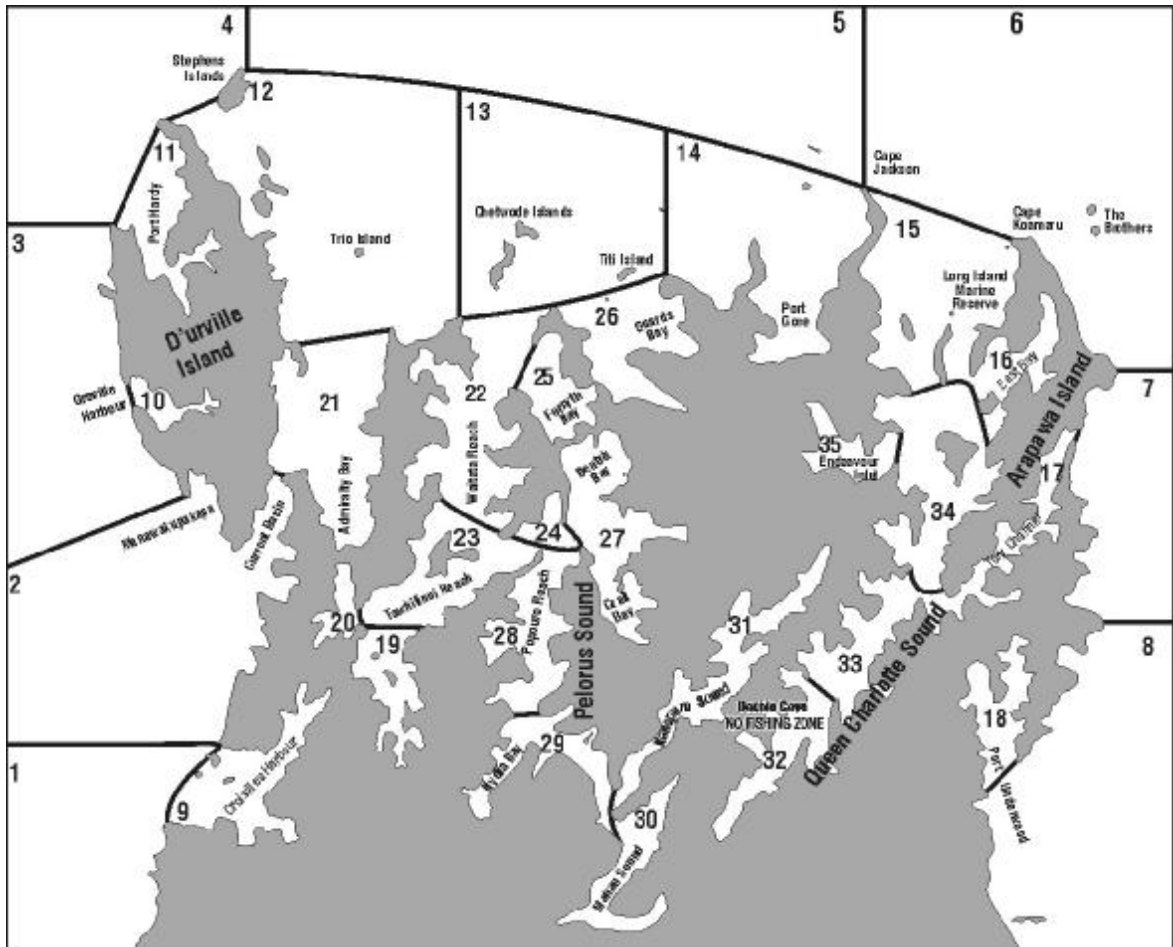
Recreational fishing survey zones used for the Patterson Inlet (Stewart Is) survey with *survey* code **PAT93**.



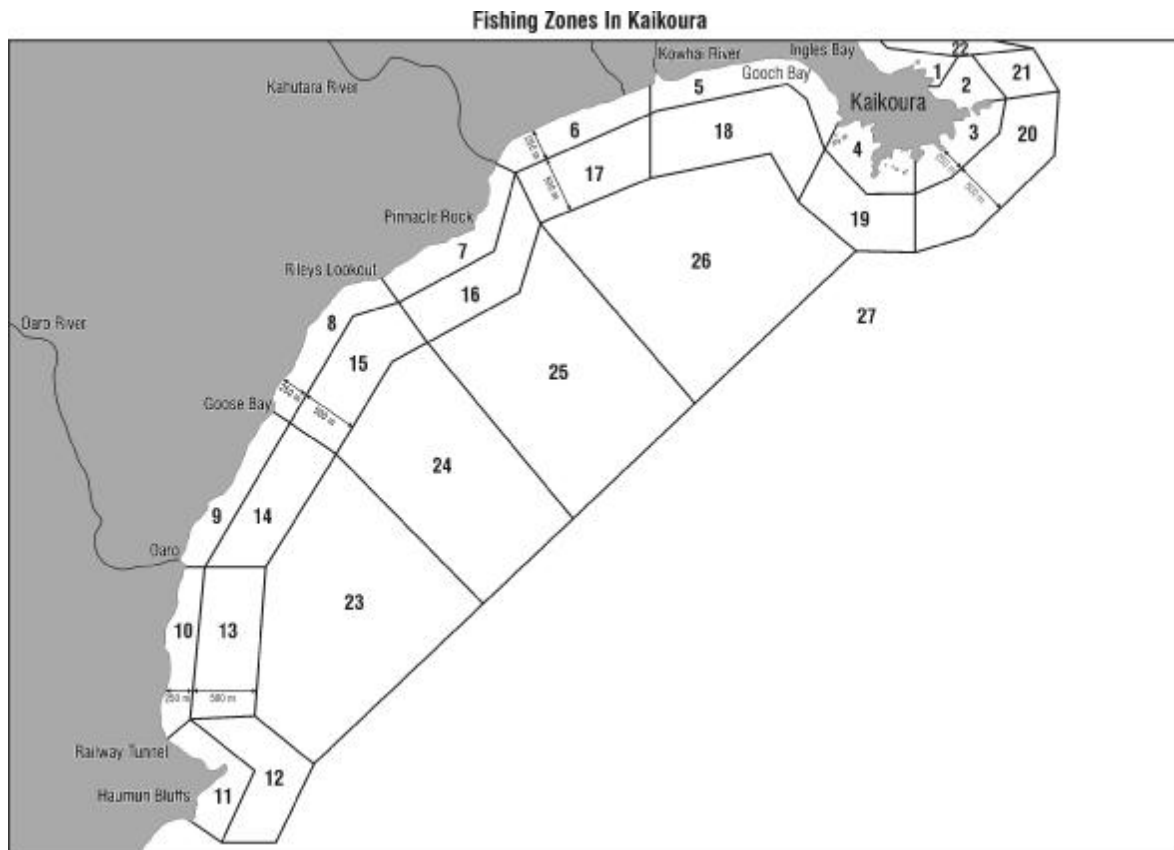
Recreational fishing survey zones used for the Akaroa diary survey with *survey* code **AKA97**.



Recreational fishing survey zones used for the Wellington diary survey with *survey* code **WLG99**.



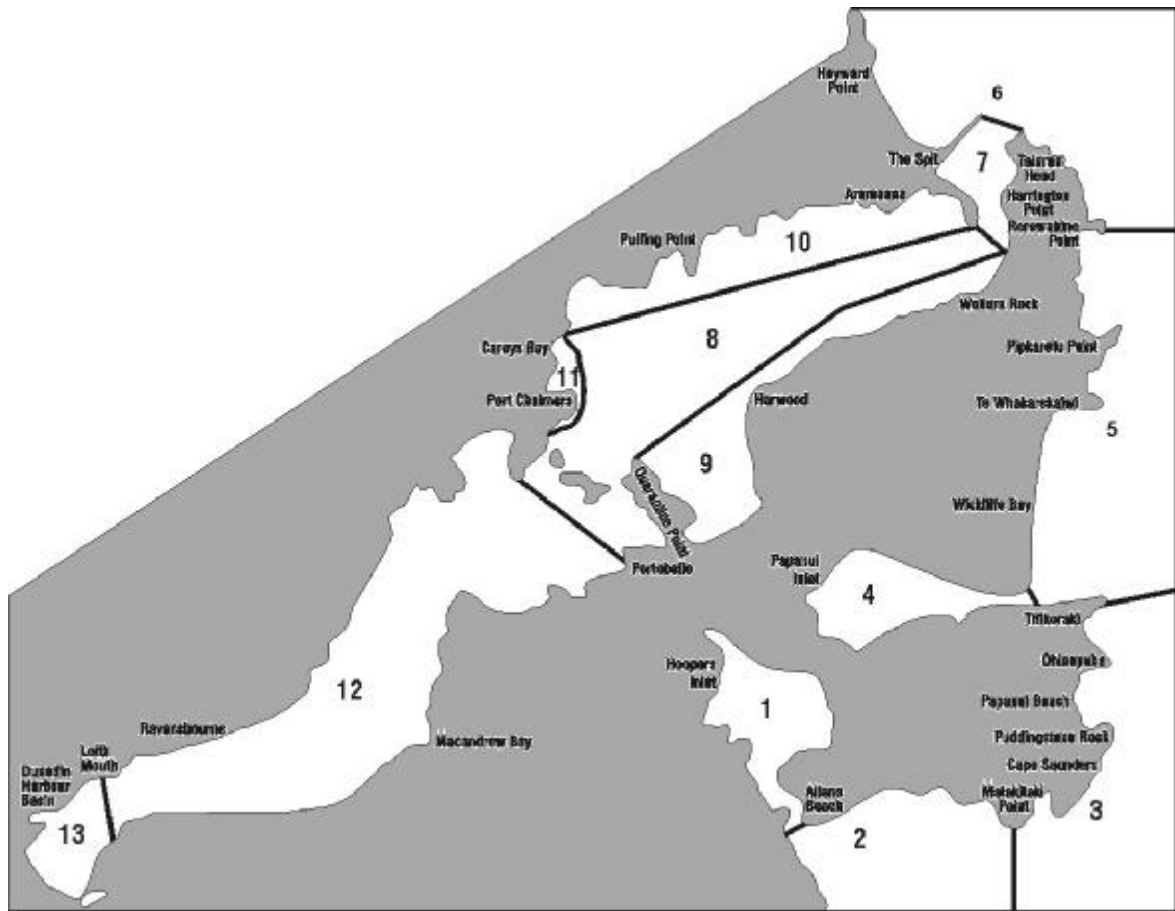
Recreational fishing survey zones used for the Greater Marlborough Sounds diary survey with *survey code MBS99*.



Recreational fishing survey zones used for the Kaikoura survey with *survey* code **KAI99**

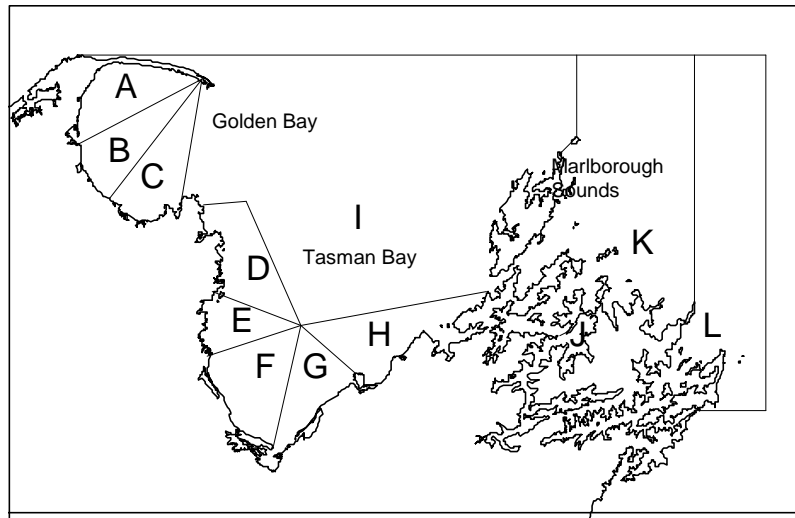


Recreational fishing survey zones used for the Bluff Harbour diary survey with *survey* code **BLF98**.



Recreational fishing survey zones used for the Otago Harbour diary survey with *survey* code **OTG98**.

Map showing the areas used in the fish\_loc attribute for the TGB04 survey.



Management sectors used by the Challenger Scallop Enhancement Company in Tasman Bay, Golden Bay, and the Marlborough Sounds. These sectors were used to identify fishing locality in the survey of recreational scallop and dredge oyster catches in Tasman and Golden Bays in 2003–04 (survey TGB04).

The following records were added to the table t\_locality\_codes for this TGB04 survey. The localities reflect the scallop management sectors in Tasman and Golden Bays as shown in the map above.

fish_loc	fish_zone	descrptn
SEA	40	Scallop management sector A
SEB	40	Scallop management sector B
SEC	40	Scallop management sector C
SED	40	Scallop management sector D
SEE	40	Scallop management sector E
SEF	40	Scallop management sector F
SEG	40	Scallop management sector G
SEH	40	Scallop management sector H
SEI	40	Scallop management sector I
SCR	40	Croisilles Harbour, in eastern Tasman Bay