Database documentation: rec_data

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NIWA Fisheries Data Management
Database Documentation Series

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1 Introduction to the Database Document series

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

The Ministry of Fisheries data set incorporates historic research data, data collected more recently by MAF Fisheries prior to the split in 1995 of policy to the Ministry of Fisheries and research to NIWA, and currently data collected by NIWA and other agencies for the Ministry of Fisheries.

This document is a brief introduction to recreational fishing database **rec_data**, and is part of the database documentation series produced by NIWA. It supersedes the previous documentation by Fisher (1998)[1] 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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[1] 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 2.)

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**[2] 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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[2] 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[3] 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[4].

Note that Figure 1 shows the main tables only. Several of the tables in the **rec_data** database have foreign keys[5], 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[6]. 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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[3] Also known as a database *schema.*

[4] A primary key is an attribute or a combination of attributes that contains an unique value to identify that record.

[5] 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.

[6] 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[7]. 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 an 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 that 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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[7] 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.
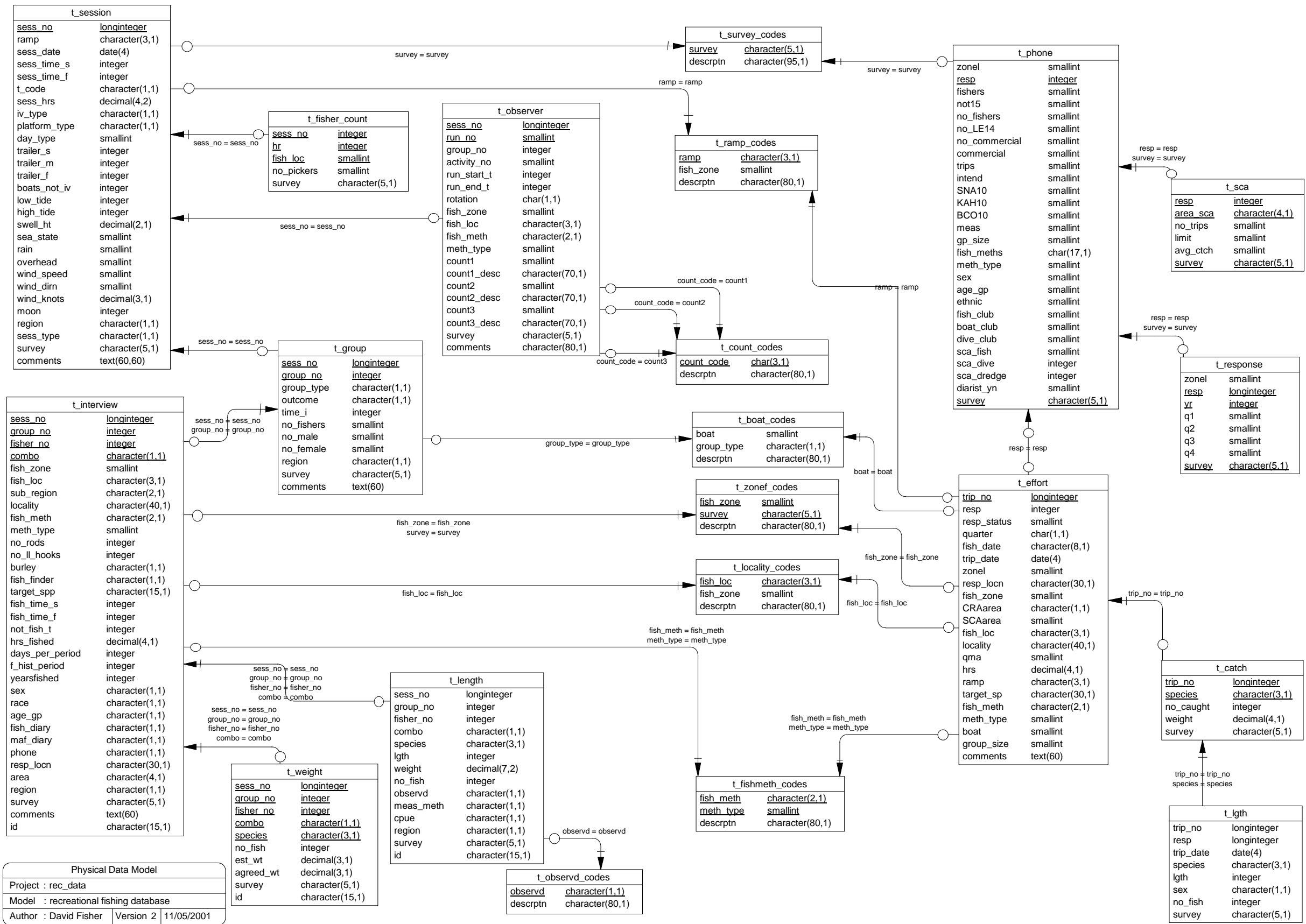
t_session

sess_no	longinteger
ramp	character(3,1)
sess_date	date(4)
sess_time_s	integer
sess_time_f	integer
t_code	character(1,1)
sess_hrs	decimal(4,2)
iv_type	character(1,1)
platform_type	character(1,1)
day_type	smallint
trailer_s	integer
trailer_m	integer
trailer_f	integer
boats_not_iv	integer
low_tide	integer
high_tide	integer
swell_ht	decimal(2,1)
sea_state	smallint
rain	smallint
overhead	smallint
wind_speed	smallint
wind_dirn	smallint
wind_knots	decimal(3,1)
moon	integer
region	character(1,1)
sess_type	character(1,1)
survey	character(5,1)
comments	text(60,60)

t_survey_codes

survey	character(5,1)
descrptn	character(95,1)

t_phone

zonel	smallint
resp	integer
fishers	smallint
not15	smallint
no_fishers	smallint
no_LE14	smallint
no_commercial	smallint
commercial	smallint
trips	smallint
intend	smallint
SNA10	smallint
KAH10	smallint
BCO10	smallint
meas	smallint
gp_size	smallint
fish_meths	char(17,1)
meth_type	smallint
sex	smallint
age_gp	smallint
ethnic	smallint
fish_club	smallint
boat_club	smallint
dive_club	smallint
sca_fish	smallint
sca_dive	integer
sca_dredge	integer
diarist_yn	smallint
survey	character(5,1)

t_fisher_count

sess_no	integer
hr	integer
fish_loc	smallint
no_pickers	smallint
survey	character(5,1)

t_observer

sess_no	longinteger
run_no	smallint
group_no	integer
activity_no	smallint
run_start_t	integer
run_end_t	integer
rotation	char(1,1)
fish_zone	smallint
fish_loc	character(3,1)
fish_meth	character(2,1)
meth_type	smallint
count1	smallint
count1_desc	character(70,1)
count2	smallint
count2_desc	character(70,1)
count3	smallint
count3_desc	character(70,1)
survey	character(5,1)
comments	character(80,1)

t_ramp_codes

ramp	character(3,1)
fish_zone	smallint
descrptn	character(80,1)

t_count_codes

count_code	char(3,1)
descrptn	character(80,1)

t_sca

resp	integer
area_sca	character(4,1)
no_trips	smallint
limit	smallint
avg_ctch	smallint
survey	character(5,1)

t_response

zonel	smallint
resp	longinteger
yr	integer
q1	smallint
q2	smallint
q3	smallint
q4	smallint
survey	character(5,1)

t_group

sess_no	longinteger
group_no	integer
group_type	character(1,1)
outcome	character(1,1)
time_i	integer
no_fishers	smallint
no_male	smallint
no_female	smallint
region	character(1,1)
survey	character(5,1)
comments	text(60)

t_boat_codes

boat	smallint
group_type	character(1,1)
descrptn	character(80,1)

t_effort

trip_no	longinteger
resp	integer
resp_status	smallint
quarter	char(1,1)
fish_date	character(8,1)
trip_date	date(4)
zonel	smallint
resp_locn	character(30,1)
fish_zone	smallint
CRAarea	character(1,1)
SCAarea	smallint
fish_loc	character(3,1)
locality	character(40,1)
qma	smallint
hrs	decimal(4,1)
ramp	character(3,1)
target_sp	character(30,1)
fish_meth	character(2,1)
meth_type	smallint
boat	smallint
group_size	smallint
comments	text(60)

t_interview

sess_no	longinteger
group_no	integer
fisher_no	integer
combo	character(1,1)
fish_zone	smallint
fish_loc	character(3,1)
sub_region	character(2,1)
locality	character(40,1)
fish_meth	character(2,1)
meth_type	smallint
no_rods	integer
no_ll_hooks	integer
burley	character(1,1)
fish_finder	character(1,1)
target_spp	character(15,1)
fish_time_s	integer
fish_time_f	integer
not_fish_t	integer
hrs_fished	decimal(4,1)
days_per_period	integer
f_hist_period	integer
yearsfished	integer
sex	character(1,1)
race	character(1,1)
age_gp	character(1,1)
fish_diary	character(1,1)
maf_diary	character(1,1)
phone	character(1,1)
resp_locn	character(30,1)
area	character(4,1)
region	character(1,1)
survey	character(5,1)
comments	text(60)
id	character(15,1)

t_zonef_codes

fish_zone	smallint
survey	character(5,1)
descrptn	character(80,1)

t_locality_codes

fish_loc	character(3,1)
fish_zone	smallint
descrptn	character(80,1)

t_length

sess_no	longinteger
group_no	integer
fisher_no	integer
combo	character(1,1)
species	character(3,1)
lgth	integer
weight	decimal(7,2)
no_fish	integer
observd	character(1,1)
meas_meth	character(1,1)
cpue	character(1,1)
region	character(1,1)
survey	character(5,1)
id	character(15,1)

t_catch

trip_no	longinteger
species	character(3,1)
no_caught	integer
weight	decimal(4,1)
survey	character(5,1)

t_fishmeth_codes

fish_meth	character(2,1)
meth_type	smallint
descrptn	character(80,1)

t_weight

sess_no	longinteger
group_no	integer
fisher_no	integer
combo	character(1,1)
species	character(3,1)
no_fish	integer
est_wt	decimal(3,1)
agreed_wt	decimal(3,1)
survey	character(5,1)
id	character(15,1)

t_observd_codes

observd	character(1,1)
descrptn	character(80,1)

t_lgth

trip_no	longinteger
resp	longinteger
trip_date	date(4)
species	character(3,1)
lgth	integer
sex	character(1,1)
no_fish	integer
survey	character(5,1)

Physical Data Model

Project : rec_data		
Model : recreational fishing database		
Author : David Fisher	Version 2	11/05/2001

Relationship labels:
survey = survey; ramp = ramp; sess_no = sess_no; count_code = count1; count_code = count2; count_code = count3; resp = resp; group_type = group_type; fish_zone = fish_zone; fish_loc = fish_loc; fish_meth = fish_meth; meth_type = meth_type; boat = boat; trip_no = trip_no; species = species; group_no = group_no; fisher_no = fisher_no; combo = combo; observd = observd

Figure 1: Entity Relationship Diagram (ERD) for the **rec_data** database.

t_weight

sess_no	integer
group_no	integer
fisher_no	smallint
combo	character(1,1)
species	character(3,1)
est_wt	decimal(3,1)
agreed_wt	decimal(3,1)
survey	character(5,1)
id	character(15,1)

code = species

rdb database

curr_spp

code	character(3,1)
com_name	character(40,1)
sci_name	character(80,3)
oth_names	character(160,3)
notes	text(40,120)
usage	character(1,1)
descrptn	character(2,1)
family_com	character(40,1)
family_sci	character(40,1)
key	character(5,1)
pref_meas_meth	character(3,1)
max_length	integer
mtab_code	integer

code = species

t_length

sess_no	longinteger
group_no	integer
fisher_no	integer
combo	character(1,1)
species	character(3,1)
lgth	integer
weight	decimal(7,2)
no_fish	integer
observd	character(1,1)
meas_meth	character(1,1)
cpue	character(1,1)
region	character(1,1)
survey	character(5,1)
id	character(15,1)

code = species

t_catch

trip_no	longinteger
species	character(3,1)
no_caught	integer
weight	decimal(4,1)
survey	character(5,1)

Physical Data Model

Project : rec_data		
Model : rdb relationships		
Author :	Version:	12/3/98

code = species

t_lgth

trip_no	longinteger
resp	longinteger
trip_date	date(10)
species	character(3,1)
lgth	integer
no_fish	integer

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 an 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.*
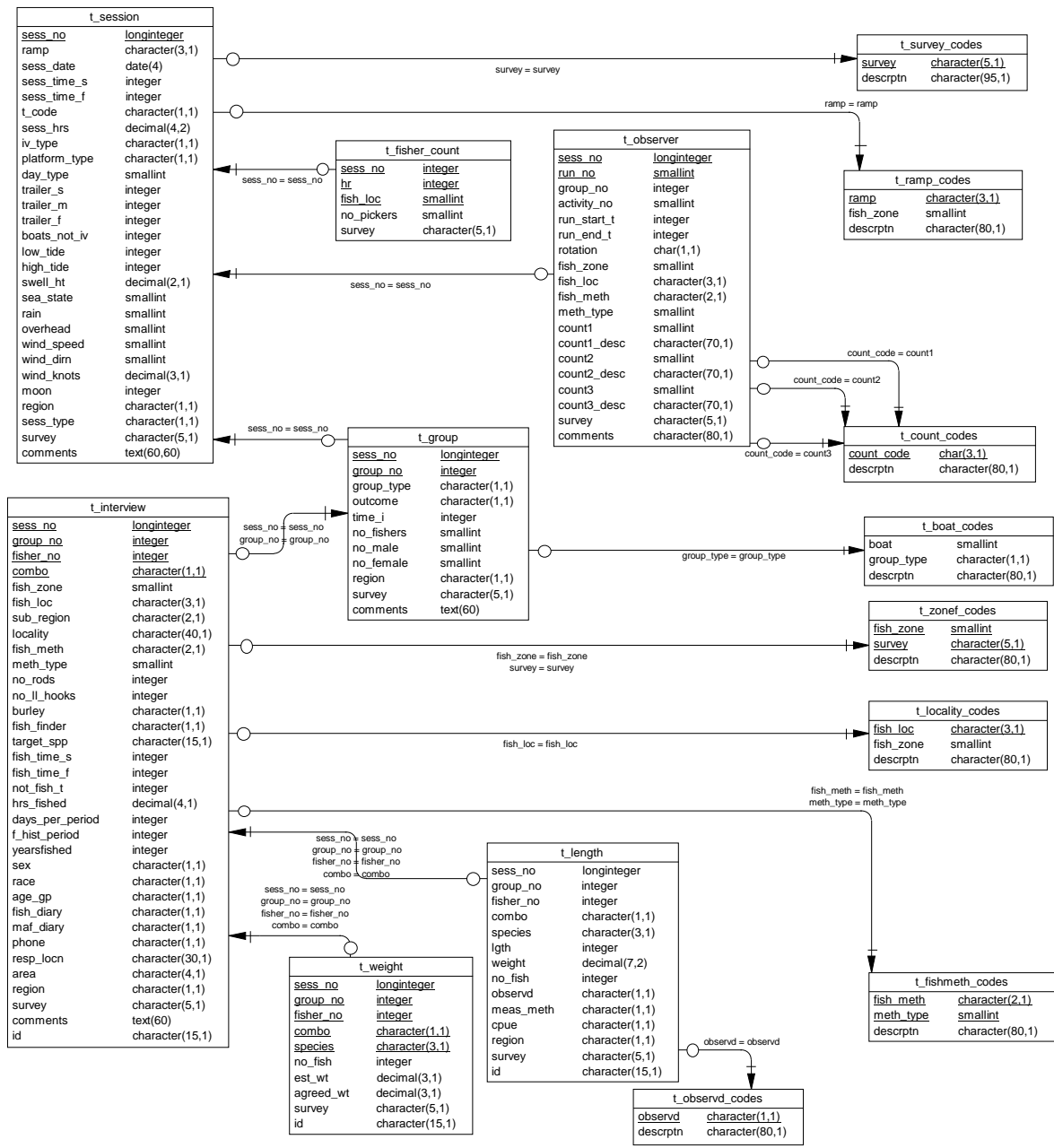
t_session

sess_no	longinteger
ramp	character(3,1)
sess_date	date(4)
sess_time_s	integer
sess_time_f	integer
t_code	character(1,1)
sess_hrs	decimal(4,2)
iv_type	character(1,1)
platform_type	character(1,1)
day_type	smallint
trailer_s	integer
trailer_m	integer
trailer_f	integer
boats_not_iv	integer
low_tide	integer
high_tide	integer
swell_ht	decimal(2,1)
sea_state	smallint
rain	smallint
overhead	smallint
wind_speed	smallint
wind_dirn	smallint
wind_knots	decimal(3,1)
moon	integer
region	character(1,1)
sess_type	character(1,1)
survey	character(5,1)
comments	text(60,60)

t_survey_codes

survey	character(5,1)
descrptn	character(95,1)

survey = survey

ramp = ramp

t_ramp_codes

ramp	character(3,1)
fish_zone	smallint
descrptn	character(80,1)

t_fisher_count

sess_no	integer
hr	integer
fish_loc	smallint
no_pickers	smallint
survey	character(5,1)

sess_no = sess_no

t_observer

sess_no	longinteger
run_no	smallint
group_no	integer
activity_no	smallint
run_start_t	integer
run_end_t	integer
rotation	char(1,1)
fish_zone	smallint
fish_loc	character(3,1)
fish_meth	character(2,1)
meth_type	smallint
count1	smallint
count1_desc	character(70,1)
count2	smallint
count2_desc	character(70,1)
count3	smallint
count3_desc	character(70,1)
survey	character(5,1)
comments	character(80,1)

sess_no = sess_no

count_code = count1

count_code = count2

count_code = count3

t_count_codes

count_code	char(3,1)
descrptn	character(80,1)

t_group

sess_no	longinteger
group_no	integer
group_type	character(1,1)
outcome	character(1,1)
time_i	integer
no_fishers	smallint
no_male	smallint
no_female	smallint
region	character(1,1)
survey	character(5,1)
comments	text(60)

sess_no = sess_no

sess_no = sess_no
group_no = group_no

t_boat_codes

boat	smallint
group_type	character(1,1)
descrptn	character(80,1)

group_type = group_type

t_interview

sess_no	longinteger
group_no	integer
fisher_no	integer
combo	character(1,1)
fish_zone	smallint
fish_loc	character(3,1)
sub_region	character(2,1)
locality	character(40,1)
fish_meth	character(2,1)
meth_type	smallint
no_rods	integer
no_ll_hooks	integer
burley	character(1,1)
fish_finder	character(1,1)
target_spp	character(15,1)
fish_time_s	integer
fish_time_f	integer
not_fish_t	integer
hrs_fished	decimal(4,1)
days_per_period	integer
f_hist_period	integer
yearsfished	integer
sex	character(1,1)
race	character(1,1)
age_gp	character(1,1)
fish_diary	character(1,1)
maf_diary	character(1,1)
phone	character(1,1)
resp_locn	character(30,1)
area	character(4,1)
region	character(1,1)
survey	character(5,1)
comments	text(60)
id	character(15,1)

sess_no = sess_no
group_no = group_no

t_zonef_codes

fish_zone	smallint
survey	character(5,1)
descrptn	character(80,1)

fish_zone = fish_zone
survey = survey

t_locality_codes

fish_loc	character(3,1)
fish_zone	smallint
descrptn	character(80,1)

fish_loc = fish_loc

fish_meth = fish_meth
meth_type = meth_type

sess_no = sess_no
group_no = group_no
fisher_no = fisher_no
combo = combo

sess_no = sess_no
group_no = group_no
fisher_no = fisher_no
combo = combo

t_length

sess_no	longinteger
group_no	integer
fisher_no	integer
combo	character(1,1)
species	character(3,1)
lgth	integer
weight	decimal(7,2)
no_fish	integer
observd	character(1,1)
meas_meth	character(1,1)
cpue	character(1,1)
region	character(1,1)
survey	character(5,1)
id	character(15,1)

t_weight

sess_no	longinteger
group_no	integer
fisher_no	integer
combo	character(1,1)
species	character(3,1)
no_fish	integer
est_wt	decimal(3,1)
agreed_wt	decimal(3,1)
survey	character(5,1)
id	character(15,1)

t_fishmeth_codes

fish_meth	character(2,1)
meth_type	smallint
descrptn	character(80,1)

observd = observd

t_observd_codes

observd	character(1,1)
descrptn	character(80,1)

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 *observd* which is a foreign key to *t_observd_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 *observd.* 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. This table has a primary key of *resp* and *survey.*

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.

t_survey_codes

survey	character(5,1)
descrptn	character(95,1)

survey = survey

t_phone

zonel	smallint
resp	integer
fishers	smallint
not15	smallint
no_fishers	smallint
no_LE14	smallint
no_commercial	smallint
commercial	smallint
trips	smallint
intend	smallint
SNA10	smallint
KAH10	smallint
BCO10	smallint
meas	smallint
gp_size	smallint
fish_meths	char(17,1)
meth_type	smallint
sex	smallint
age_gp	smallint
ethnic	smallint
fish_club	smallint
boat_club	smallint
dive_club	smallint
sca_fish	smallint
sca_dive	integer
sca_dredge	integer
diarist_yn	smallint
survey	character(5,1)

resp = resp
survey = survey

t_sca

resp	integer
area_sca	character(4,1)
no_trips	smallint
limit	smallint
avg_ctch	smallint
survey	character(5,1)

t_ramp_codes

ramp	character(3,1)
fish_zone	smallint
descrptn	character(80,1)

ramp = ramp

resp = resp
survey = survey

t_response

zonel	smallint
resp	longinteger
yr	integer
q1	smallint
q2	smallint
q3	smallint
q4	smallint
survey	character(5,1)

t_boat_codes

boat	smallint
group_type	character(1,1)
descrptn	character(80,1)

resp = resp

boat = boat

t_zonef_codes

fish_zone	smallint
survey	character(5,1)
descrptn	character(80,1)

t_effort

trip_no	longinteger
resp	integer
resp_status	smallint
quarter	char(1,1)
fish_date	character(8,1)
trip_date	date(4)
zonel	smallint
resp_locn	character(30,1)
fish_zone	smallint
CRAarea	character(1,1)
SCAarea	smallint
fish_loc	character(3,1)
locality	character(40,1)
qma	smallint
hrs	decimal(4,1)
ramp	character(3,1)
target_sp	character(30,1)
fish_meth	character(2,1)
meth_type	smallint
boat	smallint
group_size	smallint
comments	text(60)

fish_zone = fish_zone

t_locality_codes

fish_loc	character(3,1)
fish_zone	smallint
descrptn	character(80,1)

fish_loc = fish_loc

trip_no = trip_no

t_catch

trip_no	longinteger
species	character(3,1)
no_caught	integer
weight	decimal(4,1)
survey	character(5,1)

fish_meth = fish_meth
meth_type = meth_type

t_fishmeth_codes

fish_meth	character(2,1)
meth_type	smallint
descrptn	character(80,1)

trip_no = trip_no
species = species

t_lgth

trip_no	longinteger
resp	longinteger
trip_date	date(4)
species	character(3,1)
lgth	integer
sex	character(1,1)
no_fish	integer
survey	character(5,1)

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 2 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_observd_codes** : documents the observed codes used in the attribute *t_length.observd*.
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'[8].
    (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'.*

---

[8] See Appendix 2 for an explanation of the *survey* codes referred to above.

(d) **v_nat97_effort**[9] : 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.*

---

[9] 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.

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Attributes	Data Type	Null?	Comment
sea_state	smallint		Sea conditions, refer to Appendix 2 of the database documentation for the codes.
rain	smallint		Rain, refer to Appendix 2 of the database documentation for the codes.
overhead	smallint		Overhead conditions, refer to Appendix 2 of the database documentation for the codes.
wind_speed	smallint		Wind speed, refer to Appendix 2 of the database documentation for the codes.
wind_dirn	smallint		Wind direction, refer to Appendix 2 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:       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.

Attributes	Data Type	Null?	Comment
sess_no	integer	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

Creator: smdof
Indices: 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)		

Creator: smdof
Referential: t_group refer (sess_no) INSERT t_session (sess_no)
Indices: 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 for the shellfish harvest as the interview is for the group).
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.
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 2 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.
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.

Creator:	smdof
Referential:	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_codews (fish_zone, survey)
Indices:	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

Attributes	Data Type	Null?	Comment
sess_no	integer	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.

Creator: smdof
Indices: 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	integer		Length of the fish (cm) - except for rock lobster(CRA) which is tail width in mm, or shellfish TL in 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.

Creator:	smdof
Referential:	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)
Indices:	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

Attributes	Data Type	Null?	Comment
observd	character(1,1)	No	Code for the observed status of fish.
descrptn	character(80,1)	No	Description of the observd code.

Creator: smdof
Indices: 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.
group_no	integer	No	Group number or boat number.
activity_no	smallint	No	Activity number.
run_start_t	integer		Run start time.
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)		

```
Creator:      smdof
Indices:      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.

Creator: smdof
Referential: t_observer refer (ses_no) INSERT t_session (sess_no)
Indices: 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.

Creator: dba
Indices: 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.

Creator: dba
Indices: 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
zonel	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
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

Attributes	Data Type	Null?	Comment
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.
ethnic	smallint		Ethnic group : 1=European or Pakeha, 2=NZ Maori, 3=Pacific groups, 4=Other.
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

Creator: smdof
Indices: 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.

Creator: smdof
Indices: 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

Attributes	Data Type	Null?	Comment
zonel	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.
yr	integer		year
q1	smallint		quarter 1 response status
q2	smallint		quarter 2 response status
q3	smallint		quarter 3 response status
q4	smallint		quarter 4 response status
survey	character(5,1)		Survey code, 3 chars for region + 2 numeric for yr.

Creator: smdof
Indices: NORMAL (2, 15) response_resp_ndx ON (resp)
                NORMAL (2, 15) response_yr_ndx ON (yr)
                UNIQUE t_response_pk ON (resp, yr, survey)
                NORMAL (2, 15) response_survey_ndx ON (survey)

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).
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 2 of the database documentation for areas.
fish_loc	character(3,1)		Locality code, for where fished, (refer t_locality_codes).
locality	character(40,1)		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 2 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)		

Creator:	dba
Referential:	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)
Indices:	UNIQUE effort_indx ON (trip_no)
	NORMAL (2, 15) eff_resp_indx ON (resp)
	NORMAL (2, 15) eff_zonl_indx ON (zonel)
	NORMAL (2, 15) eff_zonf_indx ON (fish_zone)
	NORMAL (2, 15) eff_gear_indx ON (fish_meth)
	NORMAL (2, 15) eff_boat_indx ON (boat)
	NORMAL (2, 15) eff_target_indx ON (target_sp)
	NORMAL (2, 15) eff_survey_indx ON (survey)
	NORMAL (2, 15) eff_date_indx ON (trip_date)

5.2.5 Table 5: t_catch

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

Attributes	Data Type	Null?	Comment
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_indx ON (species)
NORMAL (2, 15) ctch_survey_ndx ON (survey)
UNIQUE ctch_indx ON (trip_no, species)

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5.2.6   Table 6: t_lgth

Comment: Diarist's fish length measurements.

Attributes	Data Type	Null?	Comment
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

Creator: smdof
Indices: 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.

Attributes	Data Type	Null?	Comment
survey	character(5,1)	No	Survey code: 3 chars for region + 2 numerics for year.
descrptn	character(95,1)		Description of the code.

Creator: smdof
Indices: 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.

Attributes	Data Type	Null?	Comment
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.

Creator: dba
Indices: 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).

Creator: smdof
Indices: 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.

Creator: dba
Indices: 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

Creator: smdof
Indices: 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.
group_type	character(1,1)		Group type, eg boat type as used in t_group.
descrptn	character(80,1)		Description of the code.

Creator: 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:

Fact	Certainty or an existence in the information system.
Formula	Calculation employed in the information system.
Validation	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)

sess_no   Session number must be unique.

ramp   Code for a ramp or beach. Must be a valid code as listed in *t_ramp_codes*.

sess_date   Session date must be a valid date, within a reasonable range for the survey, as listed in Appendix 2.

sess_time_s   Session start time must be a valid 24-hour time and fall within the range of 0 – 2359 hours.

sess_time_f   Session finish time must be a valid 24-hour time and fall within the range of 0 – 2359 hours.

t_code   Must be a valid code, as listed in Appendix 2.

iv_type   Interview type must be a valid code as listed in Appendix 2.

platform_type   `Must be a valid code as listed in Appendix 2.

day_type   Must be a valid code, as listed in Appendix 2.

trailer_s   The number of trailers should fall within the reasonable range of 0 – 200.

trailer_m   The number of trailers should fall within the reasonable range of 0 – 200.

trailer_f   The number of trailers should fall within the reasonable range of 0 – 200.

boat_not_iv   The number of boats not interviewed should fall within the reasonable range of 0 – 40.

low_tide   The time of low tide must be a valid 24 hour time and fall within the range of 0 – 2359 hours.

high_tide   The time of high tide must be a valid 24 hour time and fall within the range of 0 – 2359 hours.

swell_ht   The swell height must be a number greater than or equal to zero.

sea_state   Must be a valid code as listed in Appendix 2.

rain   Must be a valid code as listed in Appendix 2.

overhead   Overhead conditions must be a valid code as listed in Appendix 2.

wind_speed   Must be a valid code as listed in Appendix 2.

wind_dirn   Must be a valid code as listed in Appendix 2.

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 2.

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 2.

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 2.
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 2.

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 2.

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 that 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)

zonel   Zone lived in must be a valid code as listed in Appendix 2.

resp   Respondent number must be unique within each survey.

fishers   If there are fishers in the household must be a valid code in the range 1 – 2.

not15   If the fisher(s) are LE 14 the valid code is 1 (for Yes).

no_fishers   The number of fishers should fall within the reasonable range of 0 – 10.

no_LE14   The number of fishers less than or equal to 14 years old should fall within the reasonable range of 0 – 8.

no_commercial The number of commercial fishers should fall within the reasonable range of 0 – 10.

commercial   Code to indicate if they are a commercial fisher must be an integer in the range 1 – 2.

trips   The number of fishing trips must be a valid code in the range 1 – 5.

intend   Intend going fishing code must be a valid code in the range 1 – 3.

SNA10   Snapper catch code must be a valid code in the range 1 – 3.

KAH10   Kahawai catch code must be a valid code in the range 1 – 3.

BCO10   Blue cod catch code must be a valid code in the range 1 – 3.

meas   Willing to measure fish lengths code must be a valid code in the range 1 – 2.

gp_size   Fishing group size must be a valid code in the range 1 – 8.

fish_meths   The fishing method codes must be valid codes as listed in the *t_fishmeth_codes* table.

meth_type   Fishing method type code must be valid codes as listed in the *t_fishmeth_codes* table.

sex   Sex code must be a valid code in the range 1 – 2.

age_gp   The age group code must be a valid code in the range 1 to 6.

ethnic   The code for ethnic group must be a valid code in the range 1 to 4.

fish_club   Belong to a fishing club code must be a valid code in the range 1 to 2 (for Y or N).

boat_club   Belong to a boating club code must be a valid code in the range 1 to 2 (for Y or N).

dive_club   Belong to a diving club code must be a valid code in the range 1 to 2 (for Y or N).

sca_fish   Fished for scallops code must be a valid code in the range 1 to 2 (for Y or N).

sca_dive   Number of scallop dive trips should fall within the reasonable range of 0 – 20.

sca_dredge   Number of scallop dredge trips should fall within the reasonable range of 0 – 30.

diarist_yn   Prepared to keep a diary must be a valid code in the range 1 to 2 (for Y or N).

survey   Survey code must be a valid code as listed in the *t_survey_codes* table.

Central region scallop fishers survey (t_sca)

resp   The respondent number must be equal to a resp number in *t_phone*.

area_sca   Must be a valid scallop area as listed in Appendix 2.

      Multiple column checks on respondent and scallop area:
The scallop area must be a unique code for a single respondent.

no_trips   The number of trips should fall within the reasonable range of 1 – 39.

limit   The number of trips should fall within the reasonable range of 0 – 39.

avg_ctch   The average catch should fall within the reasonable range of 0 – 100.

survey   Survey code must be a valid code as listed in the *t_survey_codes* 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)

zonel   Zone lived in must be a valid code as listed in Appendix 2.

resp   Respondent number must be unique within each survey.

yr   Year must be a valid year and should fall within a reasonable range for the survey as listed in Appendix 2.

q1 – q4   Quarter's response status must be a valid code as listed in Appendix 2.

survey   Survey code must be a valid code as listed in the *t_survey_codes* table.

      Multiple column checks on respondent number, year and survey:
      The values in the resp, yr and survey attributes must 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 2.

zonel   The zone lived in code must be a valid code as listed in Appendix 2.

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 2

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

I would like to thank Kevin Mackay for his input and advice on the structure of this database, Elizabeth Bradford for her assistance with information on the earlier surveys, the reference list and comments on the first draft of this document, Bruce Hartill for his input particularly regarding the North region surveys and Dave Banks for general editorial comment.

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.

Bell, J.D., Bell, S.M., & Teirney, L.D. 1993: Results of the 1991-92 marine recreational fishing catch and effort survey, MAF Fisheries South region. *New Zealand Fisheries Data Report No. 39.* 79 p.

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Hartill, B., Blackwell, R., & Bradford, E. 1998: Estimation of mean fish weights from the landed catch at boat ramps in 1996. *NIWA Technical Report No. 31.* 40p.

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Bell, J.D. 2000?. Results from the Wellington South Coast Recreational Fishing Survey 1998. Final Research Report for Ministry of Fisheries Project REC9806.

Bell, J.D. 2000?. Results from the Marlborough Sounds Recreational Fishing Survey 1998. Final Research Report for Ministry of Fisheries Project REC9807.

Bell, J.D. 2000. Results from the Otago and Bluff Harbours Recreational Fishing Survey 1998. Final Research Report for Ministry of Fisheries Project REC9708.

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 - Reference Documentation - Code Tables and Area Maps

The following tables document the codes used for various attributes in the **rec_data** database.

survey **codes**

Diary surveys

survey	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

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	Jan01 – 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
MAK00	Maketu Taiapure fishing survey	1999 - 2001

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	t_code	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.

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

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*)
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

Group type or Boat type (*group_type*)

T   Trailerboat (included dinghies)
L   Launches (mainly at marinas)
M   Maori permit
Y   Yacht (included trailer-sailers)
C   Charterboats (launches or trailer boats)
S   Surfcasting and other land fishing
     (including shellfish harvesting / shore picking)

Intercept Outcome Codes (*outcome*)

I   Interviewed
R   Refused
Z   Incomplete interview for surfcasting mainly
N   Not interviewed
O   Other (boat skiing, picknicking etc)
X   Interviewed but invalid for CPUE analysis

Sub-region (*sub_region*)

sub_region	Description	Location Codes (*fish_loc*)
B	Bay of Islands	BLA KER RAW RUS BRT
BR	*Barrier Islands (diary zone*	
C	Coromandel East	KUA MEB MEI SHO WMM
D	Dargaville Coast	GKG HKG MBF
ES	*Eastern Gulf (diary zone)*	
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	*Firth of Thames (diary zone)*	
G	General (no area given)	
H	Hokianga Harbour	HKH
I	Inner Gulf	WAI RAN MOT
IN	*Inner Gulf (diary zone)*	
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 WVL
WS	*Western Gulf (diary zone)*	
WA	Whangaroa Harbour	WGA

Age group (*age_gp)*

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

age_gp   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.

t_length observed codes (*observd)* from *t_observd_codes*

observd   Description

1	measured
2	counted
3	observed
4	not observed
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*

meas_meth   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*

boat group_type   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

Response status for diary surveys

Codes used for attributes *q1, q2, q3, q4.*

Code   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
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 (_zonel_) by survey

survey = NAT96

zonel	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

zonel	Telephone directory - area of residence
1	Northland
2	Auckland
3	Waikato
4	Bay of Plenty

South region survey[10]

| zonel	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

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[10] South region _survey_ codes are SOU92 & SOU93

Central region survey[11]
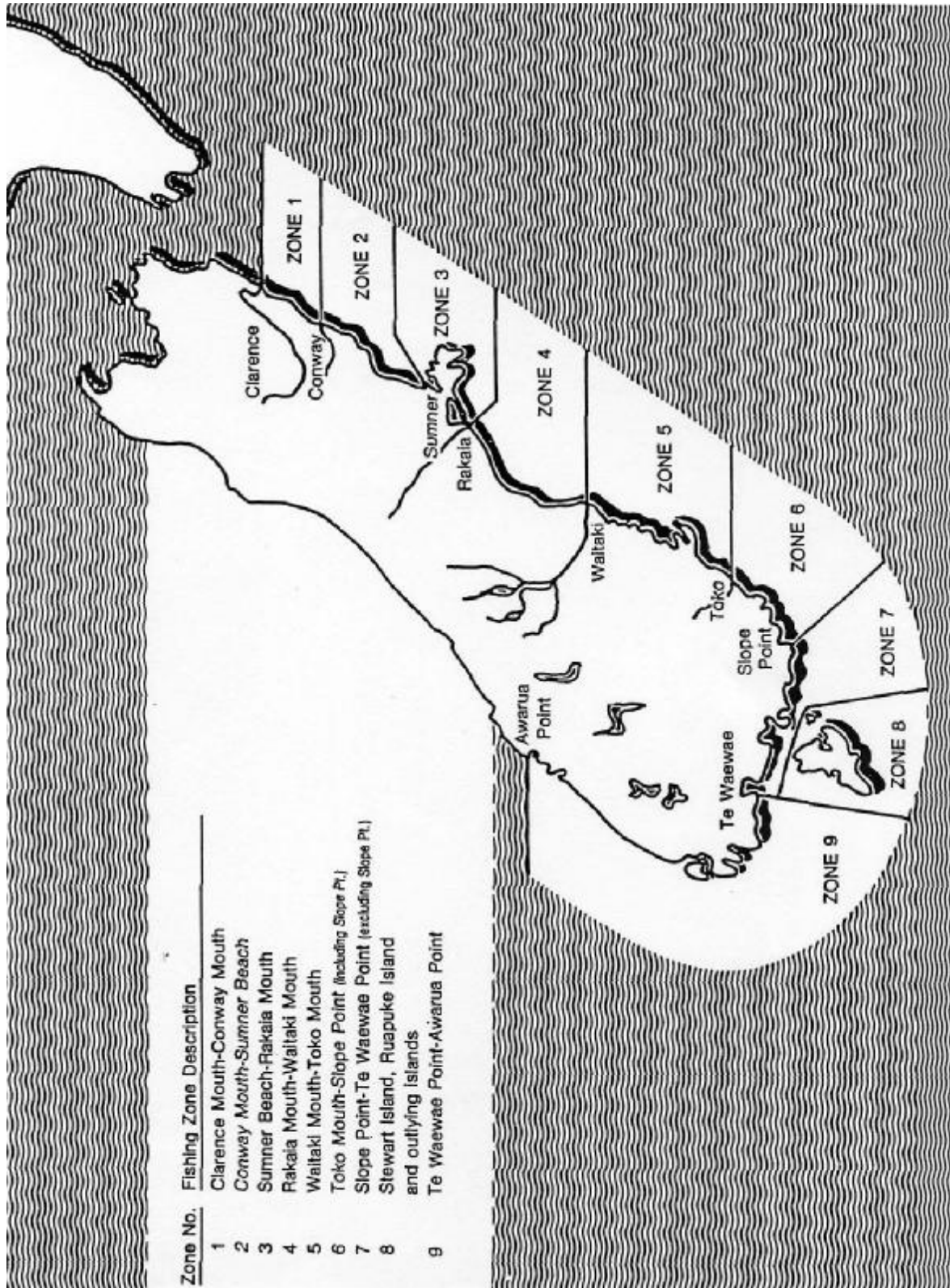
zonel   Description

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 zonel* codes for the South and Central regions correspond to the definitions for the *fish_zone* codes (see also *t_zonef_codes*).
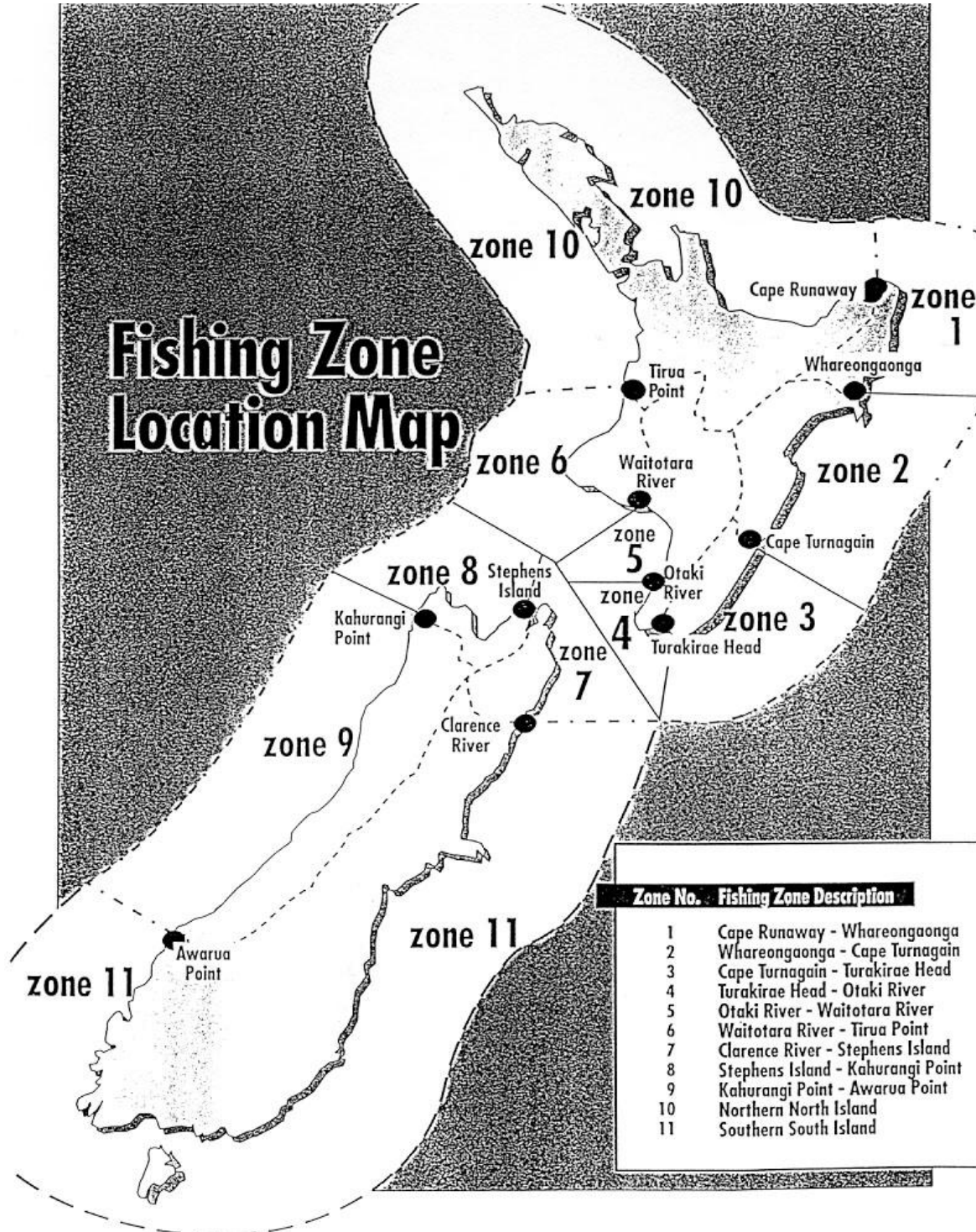
---

[11] Central region *survey* codes are CEN93 & CEN94
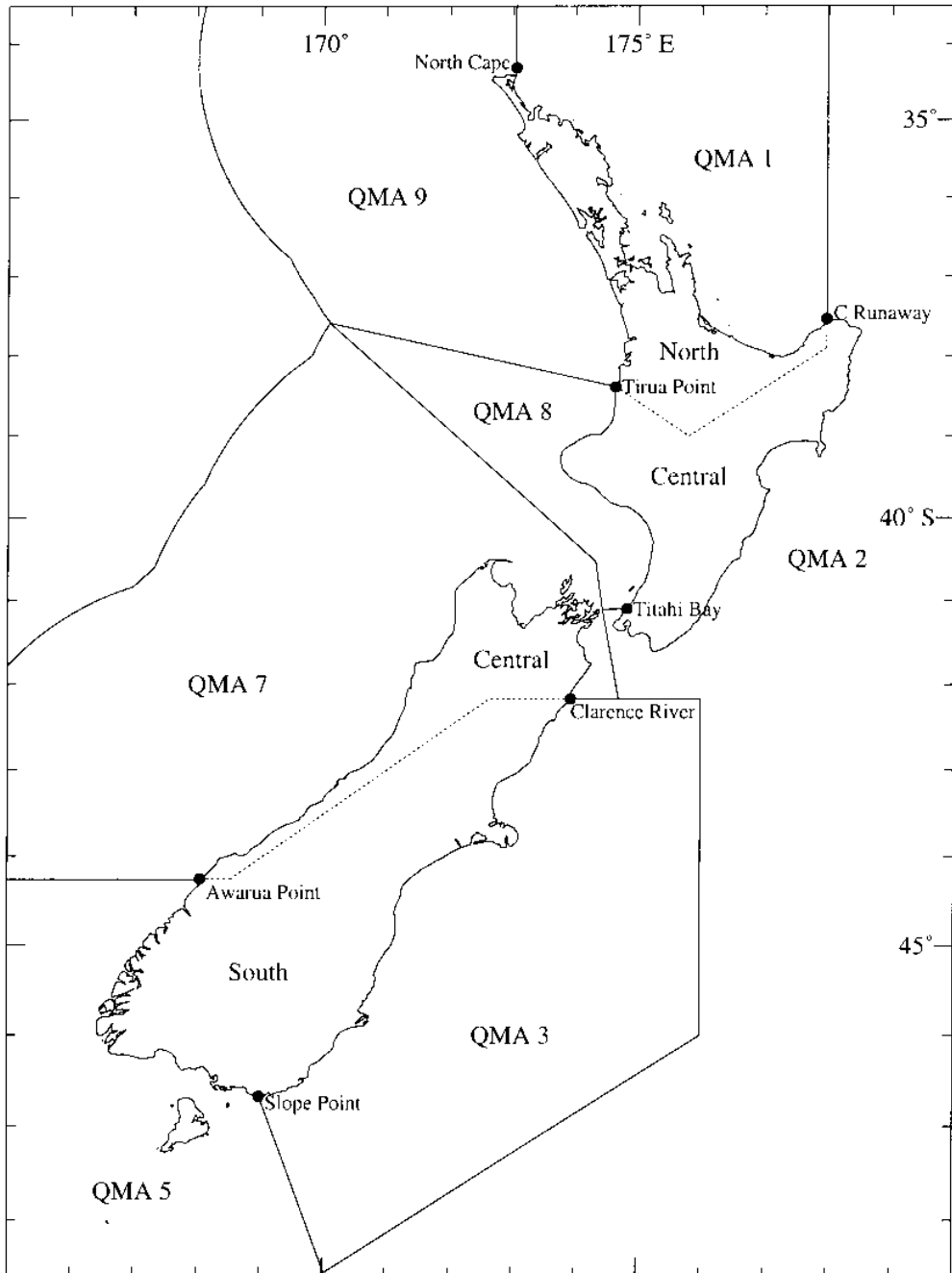
Map of New Zealand showing the land areas taken to be associated with the North, Central, and South regions, and the Quota Management Areas (QMAs) which adjoin the coastline.
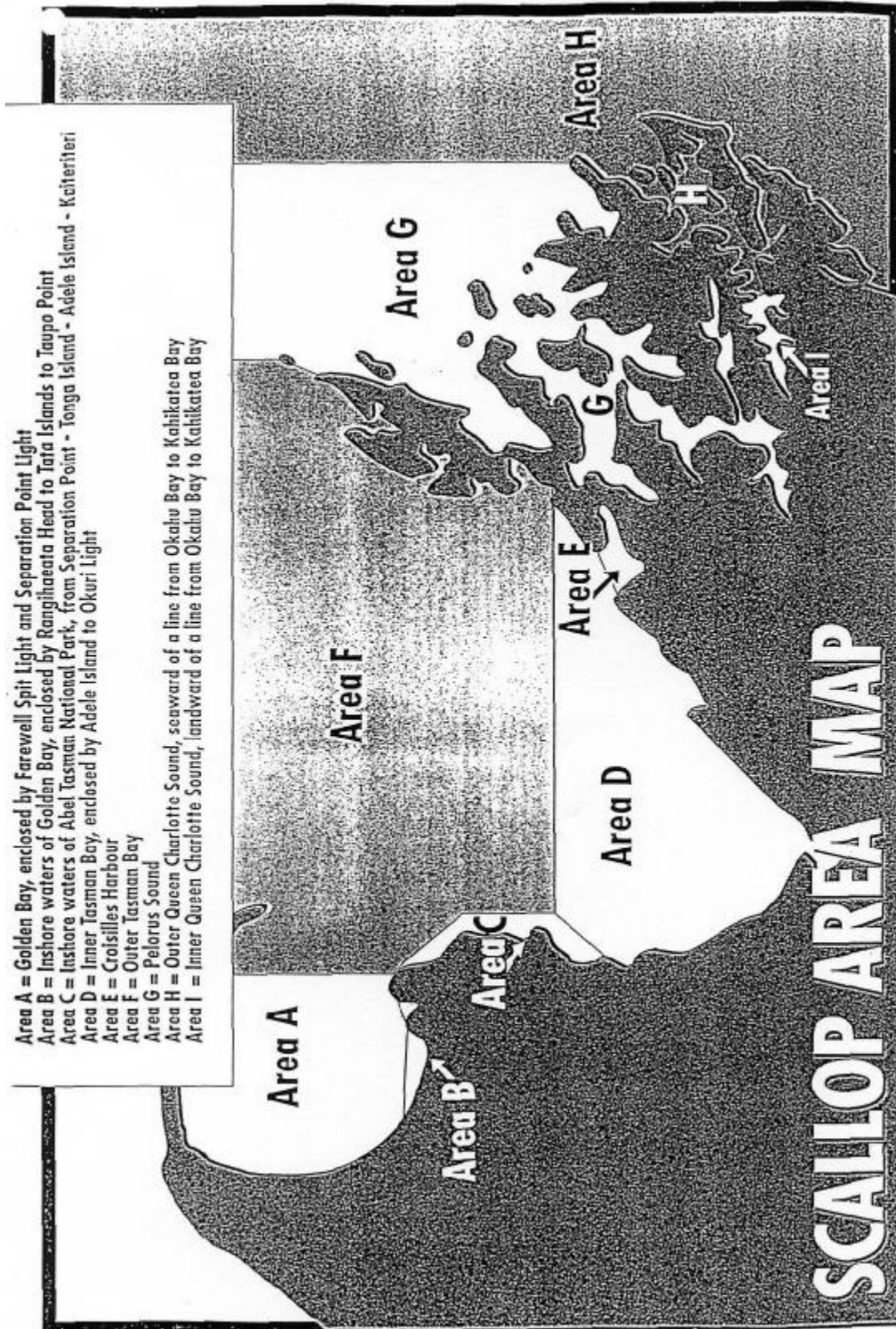
Zone No.   Fishing Zone Description

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 (including Slope Pt.)
7   Slope Point-Te Waewae Point (excluding Slope Pt.)
8   Stewart Island, Ruapuke Island and outlying Islands
9   Te Waewae Point-Awarua Point

Recreational fishing survey zones used for the South region survey

Recreational fishing survey zones used for the Central region survey

The map contains the following text:

SCALLOP AREA MAP

Area A = Golden Bay, enclosed by Farewell Spit Light and Separation Point Light
Area B = Inshore waters of Golden Bay, enclosed by Rangihaeata Head to Tata Islands to Taupo Point
Area C = Inshore waters of Abel Tasman National Park, from Separation Point - Tonga Island - Adele Island - Kaiteriteri
Area D = Inner Tasman Bay, enclosed by Adele Island to Okuri Light
Area E = Croisilles Harbour
Area F = Outer Tasman Bay
Area G = Pelorus Sound
Area H = Outer Queen Charlotte Sound, seaward of a line from Okahu Bay to Kahikatea Bay
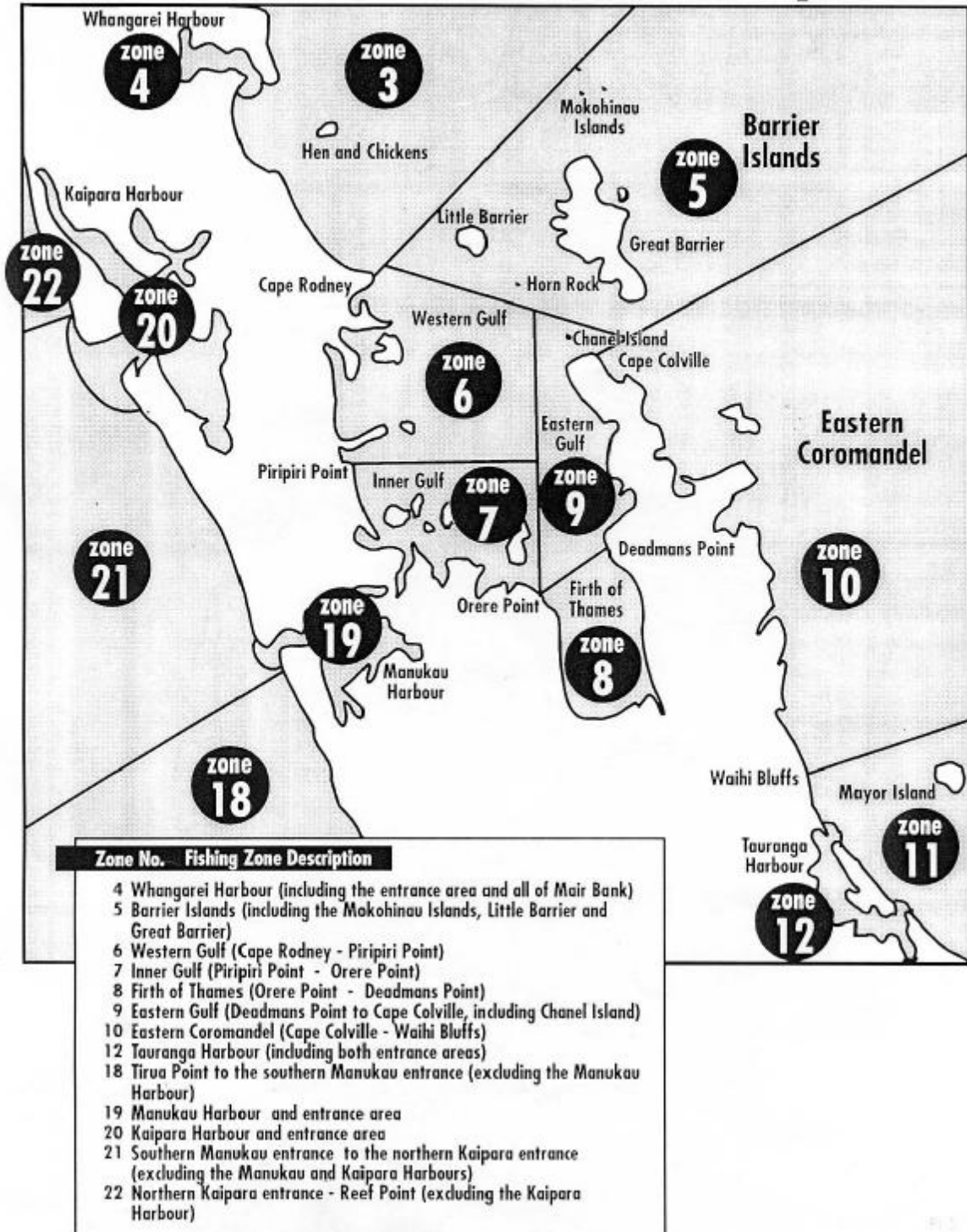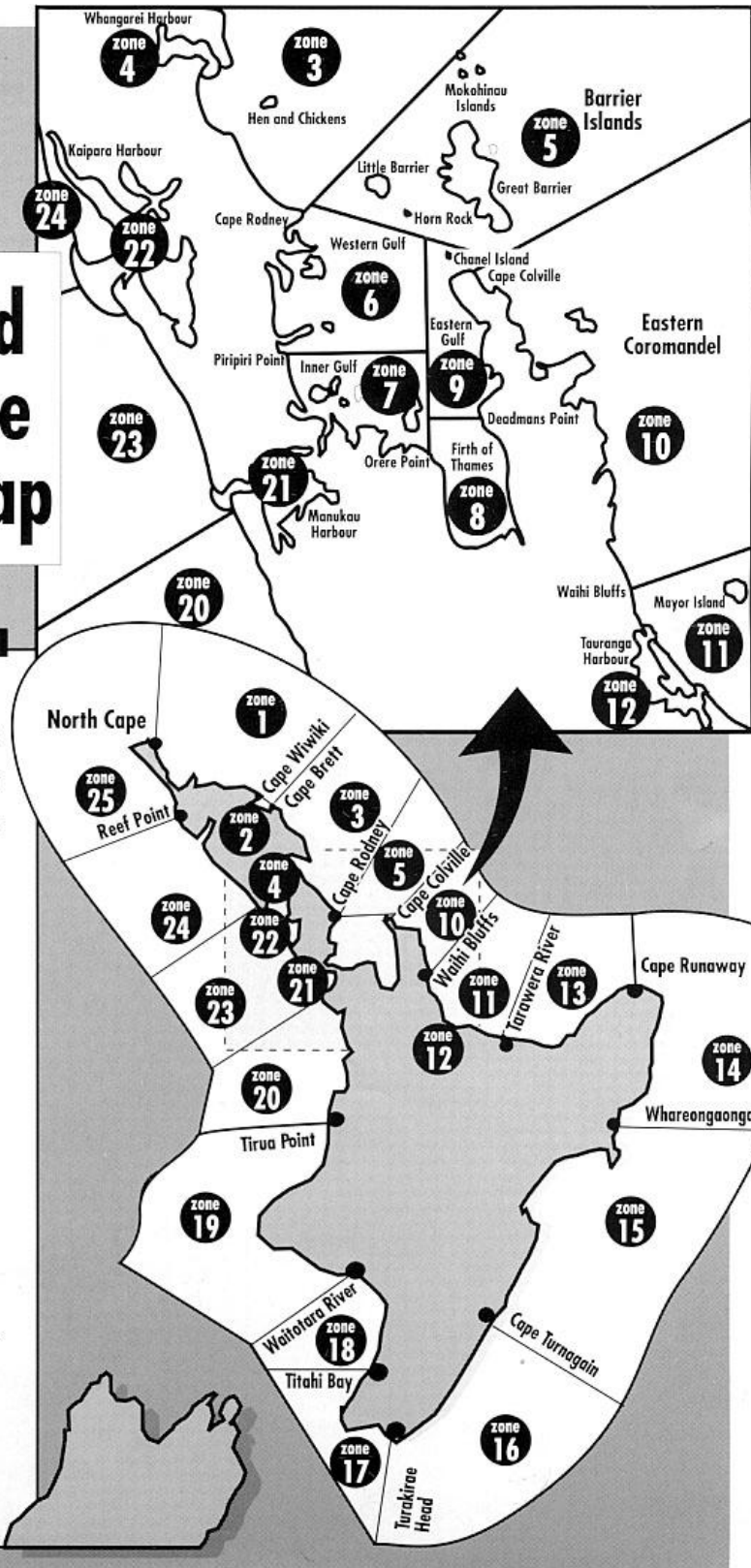Area I = Inner Queen Charlotte Sound, landward of a line from Okahu Bay to Kahikatea Bay

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.

Area A, Area B, Area C, Area D, Area E, Area F, Area G, Area H, Area I

Recreational fishing survey scallop areas used for the Central region survey
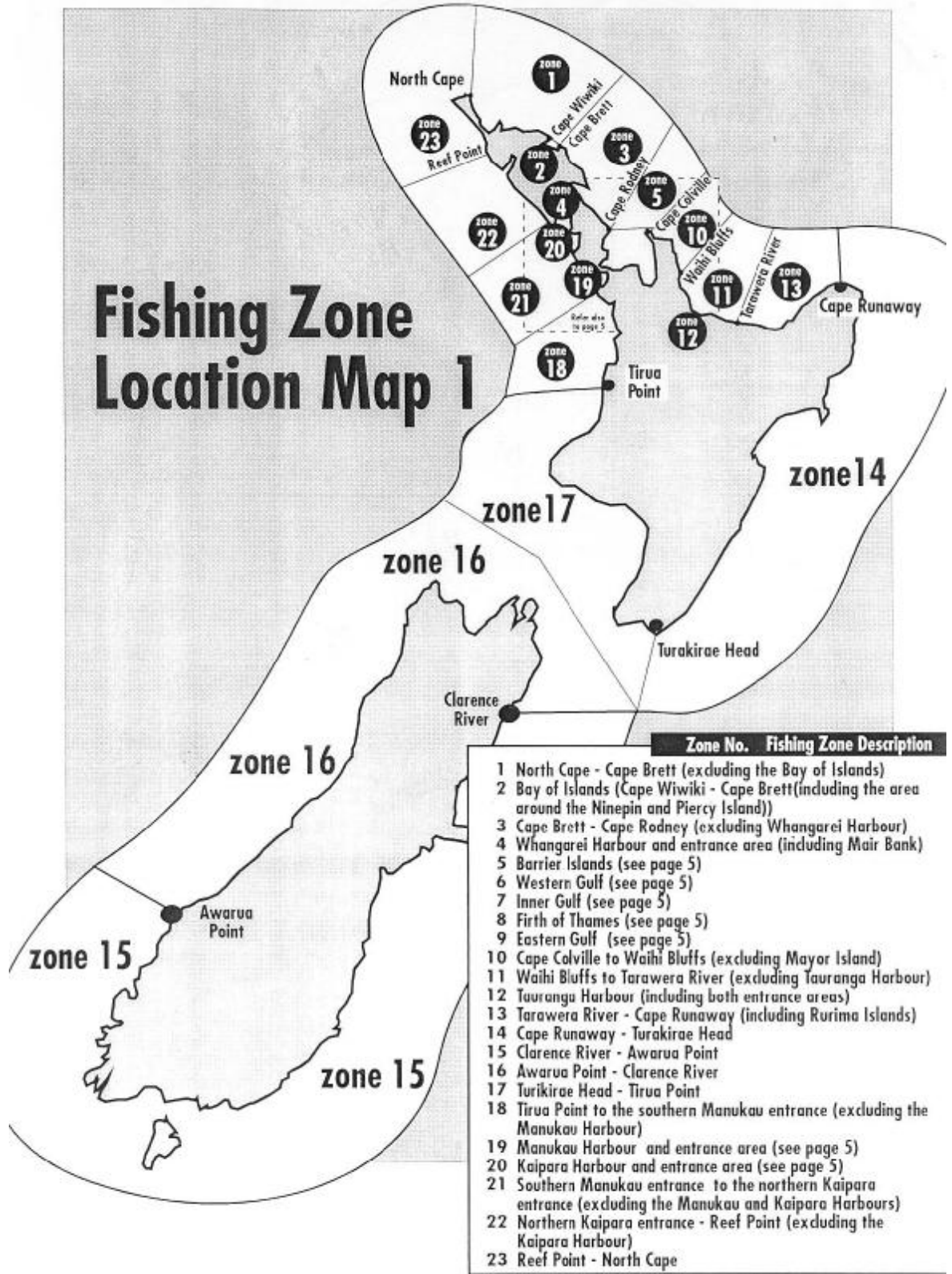
Fishing Zone Location Map 1

North Cape
Cape Wiwiki
Cape Brett
Cape Rodney
Cape Colville
Waihi Bluffs
Tarawera River
Cape Runaway
Reef Point
Refer also to page 5
Tirua Point
zone 14
zone 17
zone 16
Turakirae Head
Clarence River
zone 16
Awarua Point
zone 15
zone 15

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 (see page 5)
6	Western Gulf (see page 5)
7	Inner Gulf (see page 5)
8	Firth of Thames (see page 5)
9	Eastern Gulf (see page 5)
10	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 - Turakirae Head
15	Clarence River - Awarua Point
16	Awarua Point - Clarence River
17	Turikirae Head - Tirua Point
18	Tirua Point to the southern Manukau entrance (excluding the Manukau Harbour)
19	Manukau Harbour and entrance area (see page 5)
20	Kaipara Harbour and entrance area (see page 5)
21	Southern Manukau entrance to the northern Kaipara entrance (excluding the Manukau and Kaipara Harbours)
22	Northern Kaipara entrance - Reef Point (excluding the Kaipara Harbour)
23	Reef Point - North Cape

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

Fishing Zone Location Map 2

Zone No.	Fishing Zone Description
4	Whangarei Harbour (including the entrance area and all of 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 - Waihi Bluffs)
12	Tauranga Harbour (including both entrance areas)
18	Tirua Point to the southern Manukau entrance (excluding the Manukau Harbour)
19	Manukau Harbour and entrance area
20	Kaipara Harbour and entrance area
21	Southern Manukau entrance to the northern Kaipara entrance (excluding the Manukau and Kaipara Harbours)
22	Northern Kaipara entrance - Reef Point (excluding the Kaipara Harbour)

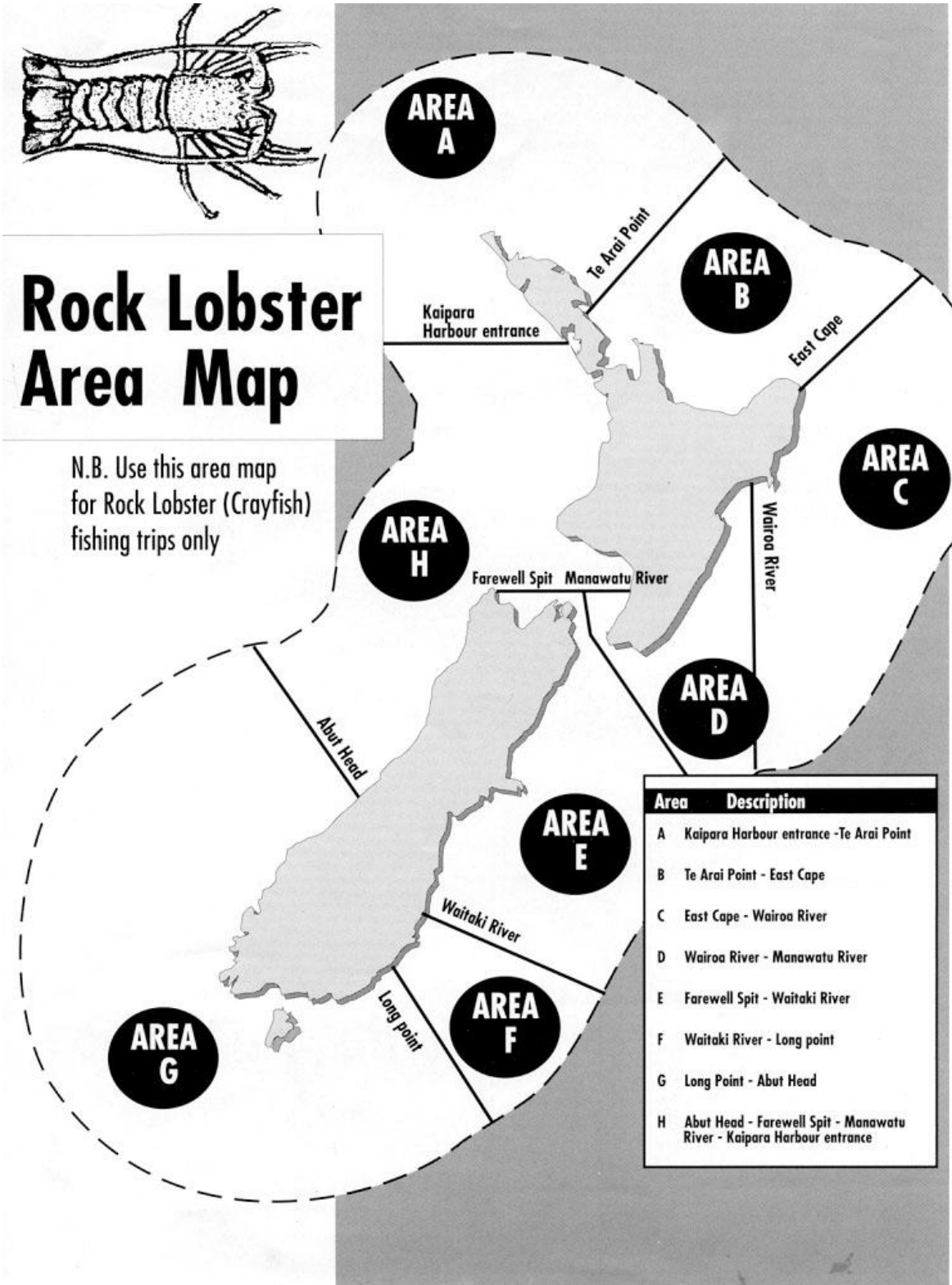Recreational fishing survey zones used for the North region survey

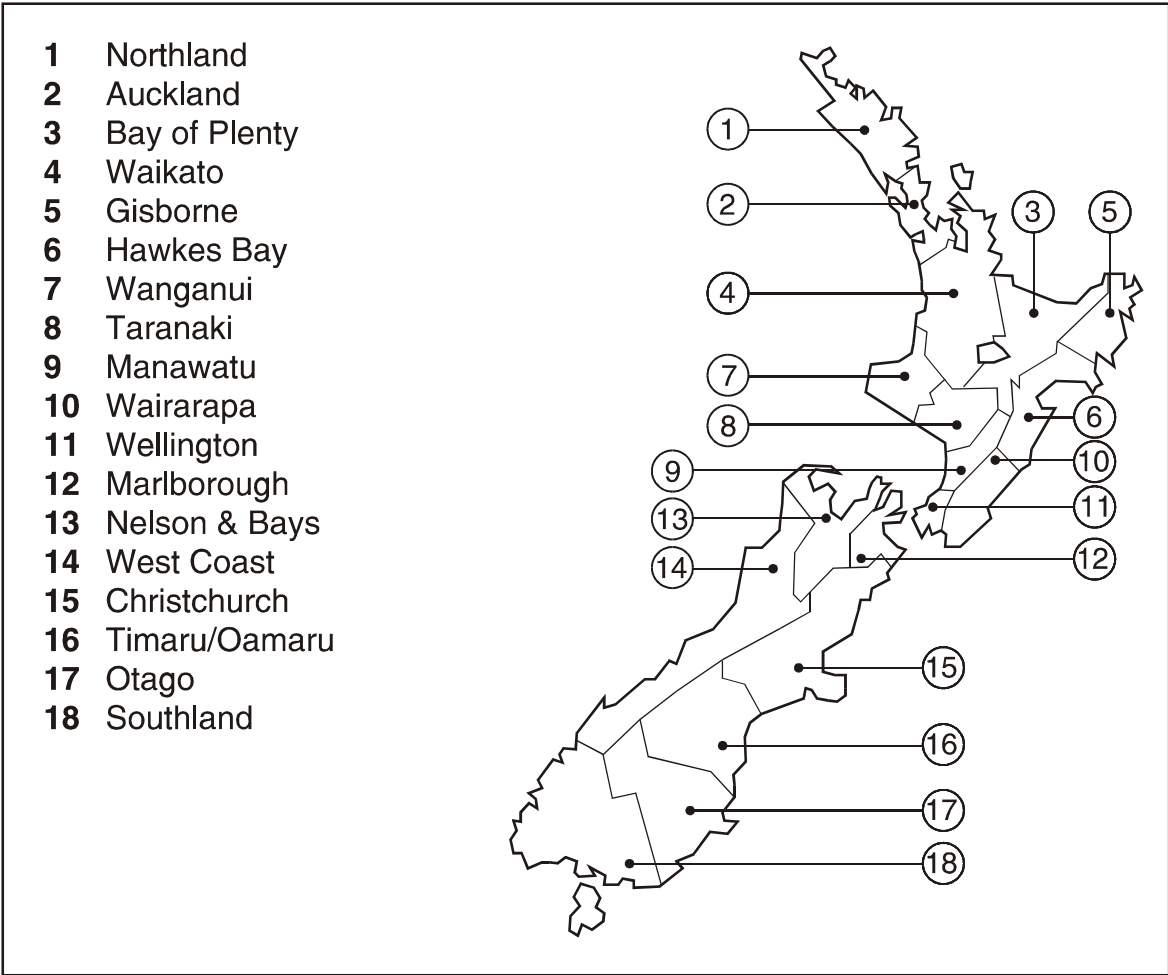Recreational fishing survey zones used for the national survey

South Island Fishing Zone Location Map

Zone No.	Fishing Zone Description
26	Pelorus, Kenepuru, Mahau Sounds (inside line from Stephens Island - Cape Jackson)
27	Queen Charlotte Sound and Tory Channel
28	Stephens Island - Clarence River (excluding Pelorus and Queen Charlotte Sounds)
29	Clarence River - Conway River
30	Conway River - Sumner Beach
31	Sumner Beach - Rakaia River
32	Rakaia River - Waitaki River
33	Waitaki River - Tokomairiro River
34	Tokomairiro River - Slope Point
35	Slope Point - Te Waewae Point
36	Stewart Island, Ruapuke Island and outlying islands (excluding Paterson Inlet)
37	Paterson Inlet
38	Te Waewae Point - Awarua Point
39	Awarua Point- Kahurangi Point
40	Kahurangi Point - Stephens Island

Recreational fishing survey zones used for the national survey

Rock Lobster Area Map

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

AREA A

AREA B

AREA C

AREA D

AREA E

AREA F

AREA G

AREA H

Te Arai Point

Kaipara Harbour entrance

East Cape

Wairoa River

Farewell Spit   Manawatu River

Abut Head

Waitaki River

Long point

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 survey

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 & Bays
14	West Coast
15	Christchurch
16	Timaru/Oamaru
17	Otago
18	Southland

The Telecom telephone book coverage areas and their numbers as used in the NAT96 diary survey. The numbers are those as used in *zonel*.
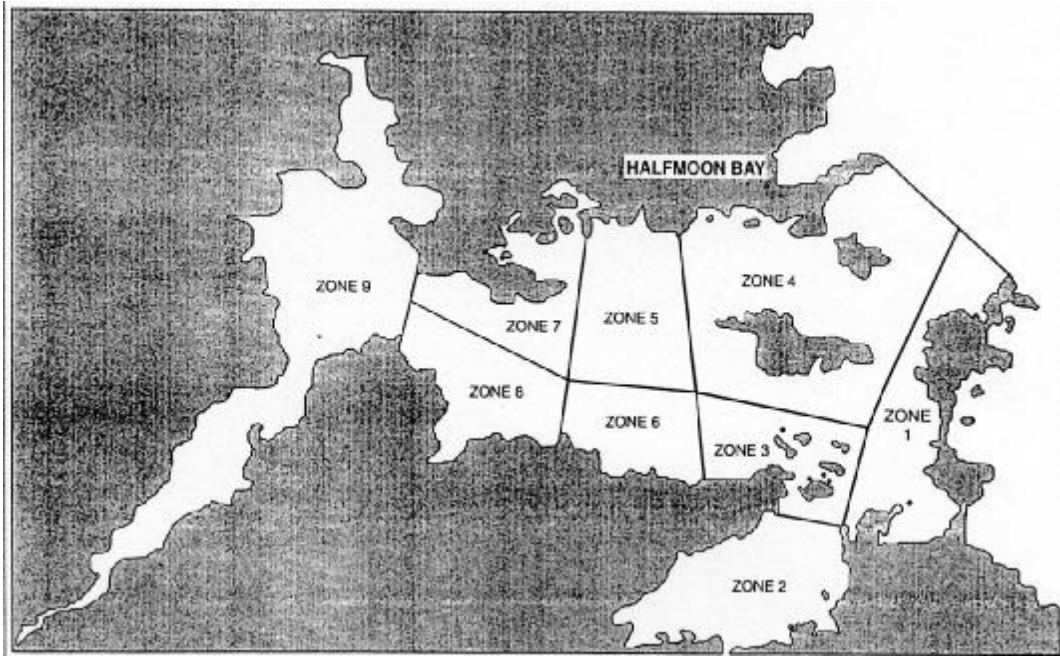
Recreational fishing survey zones used for the Patterson Inlet (Stewart Is) survey.
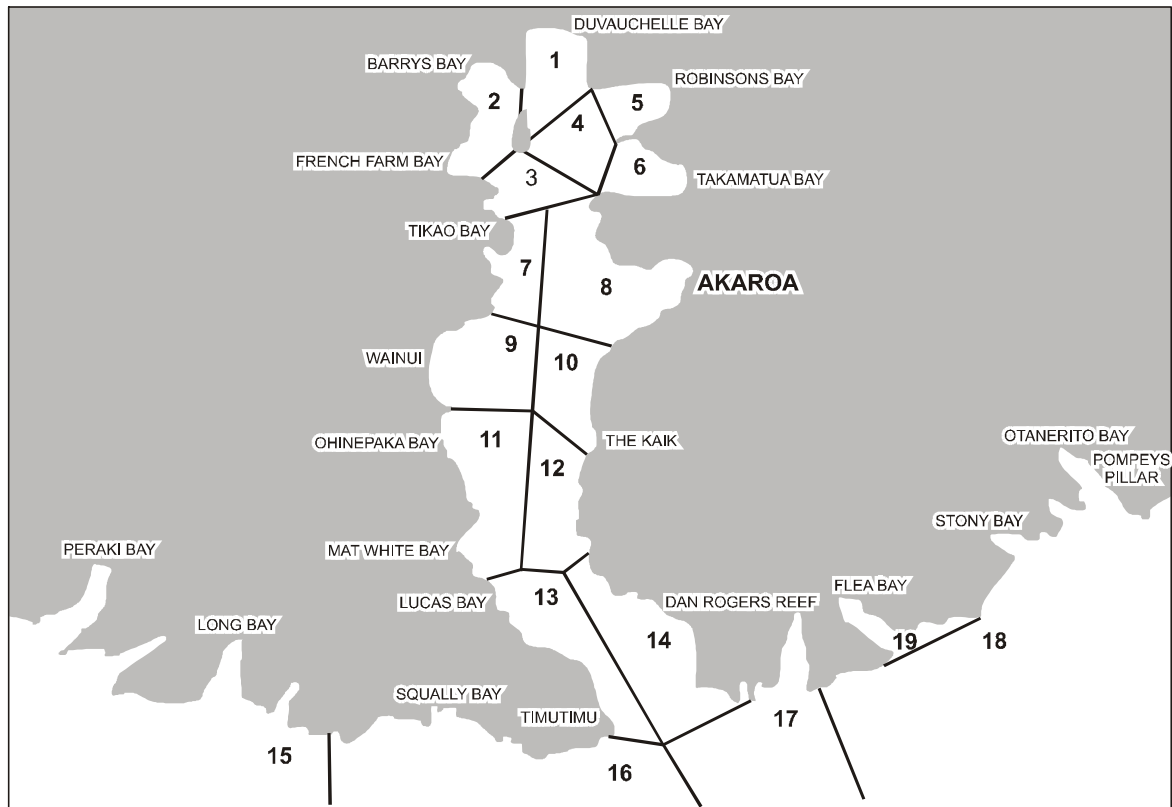
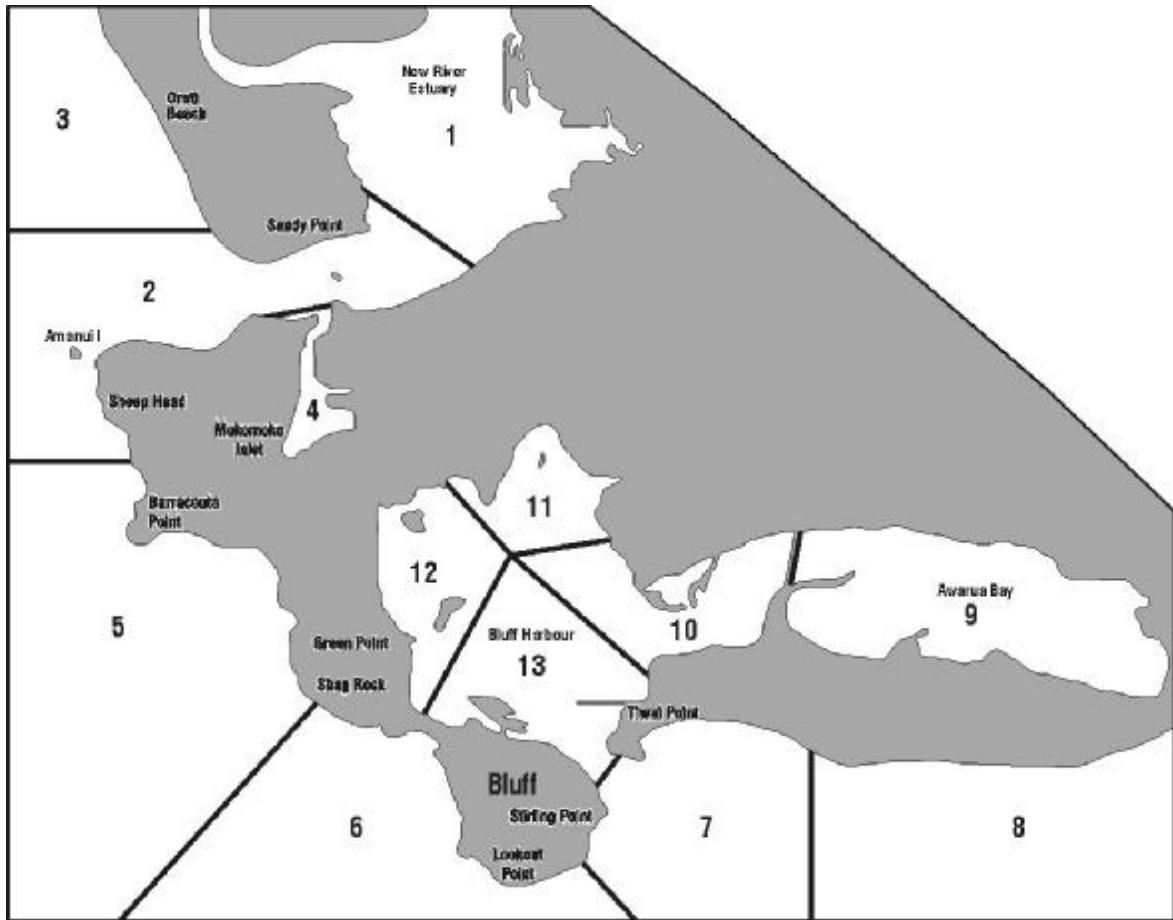Recreational fishing survey zones used for the Akaroa diary survey.
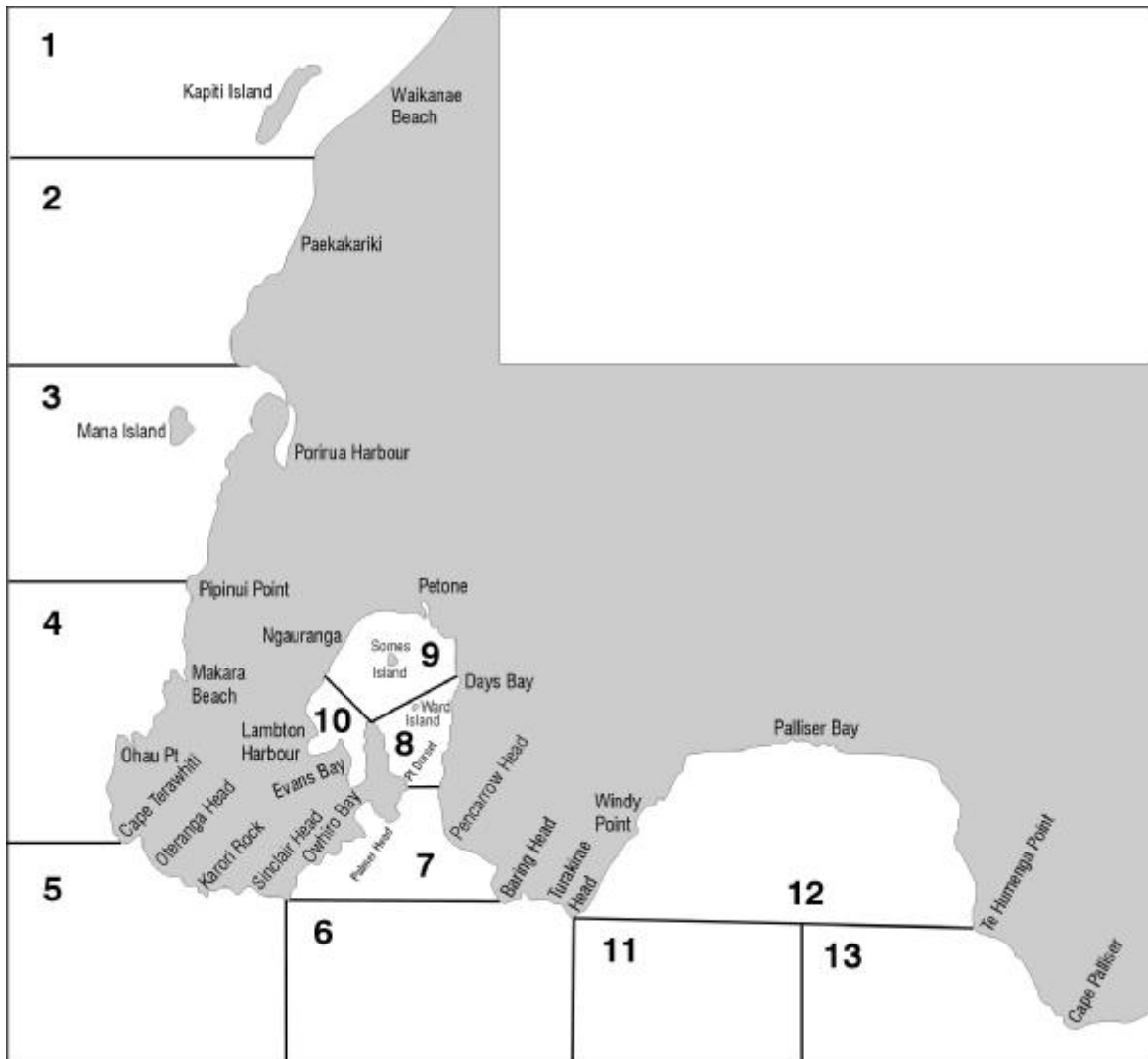
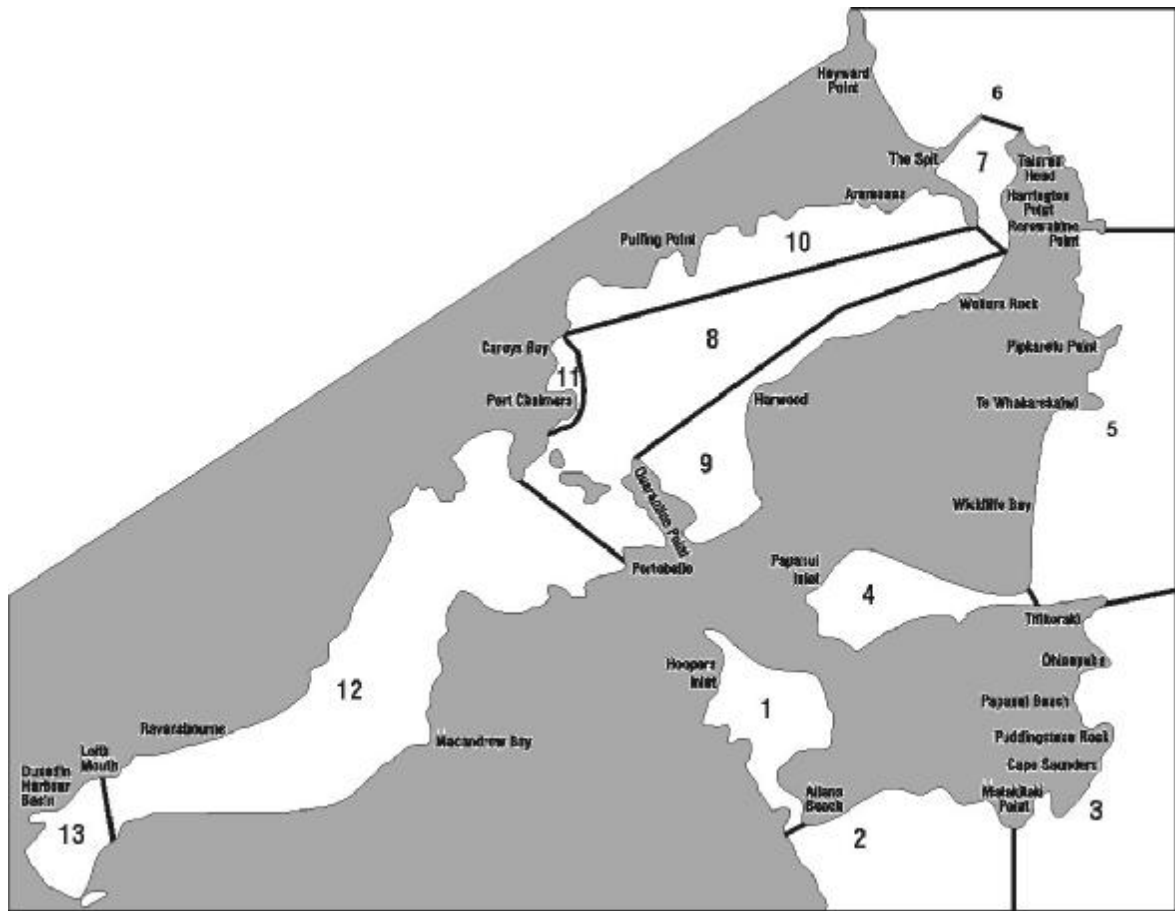Recreational fishing survey zones used for the Wellington diary survey.
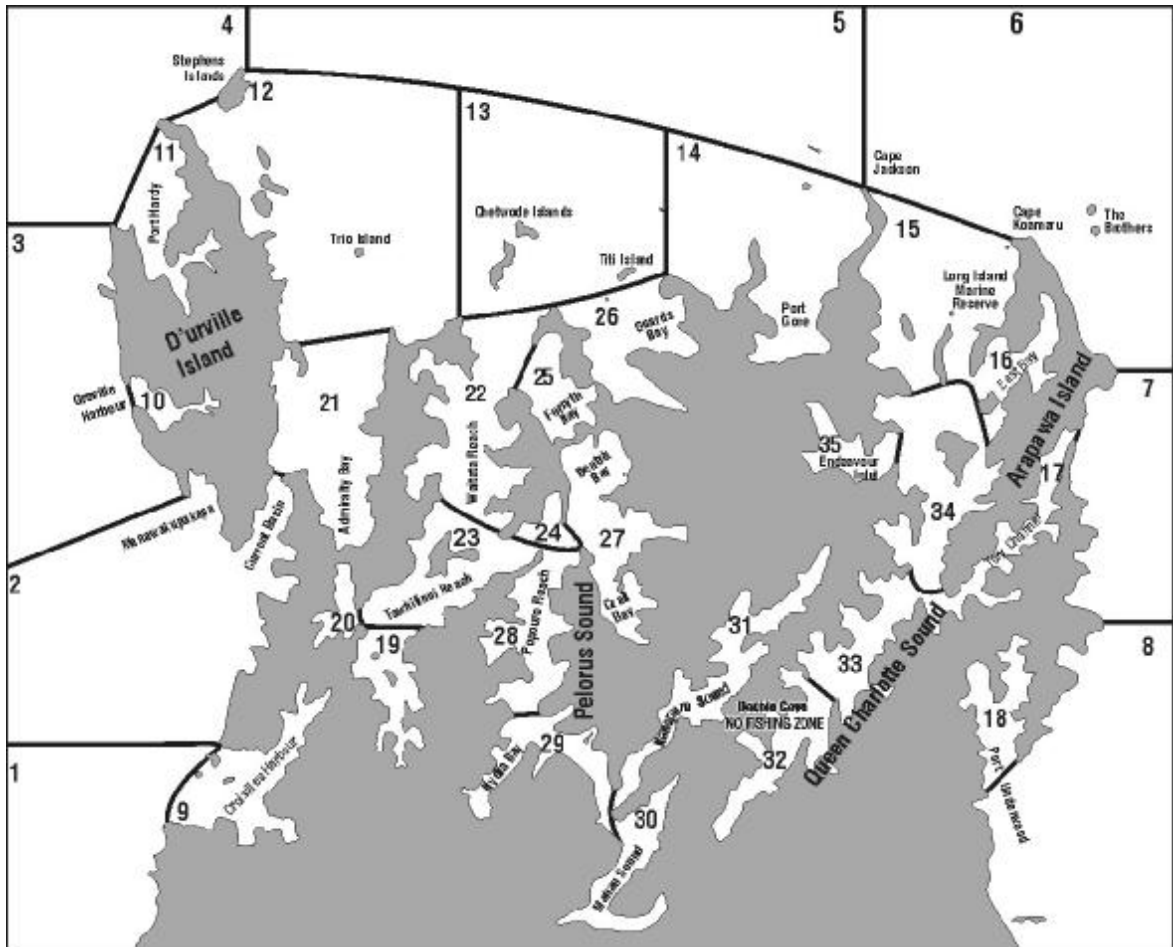
Recreational fishing survey zones used for the Greater Marlborough Sounds diary survey.
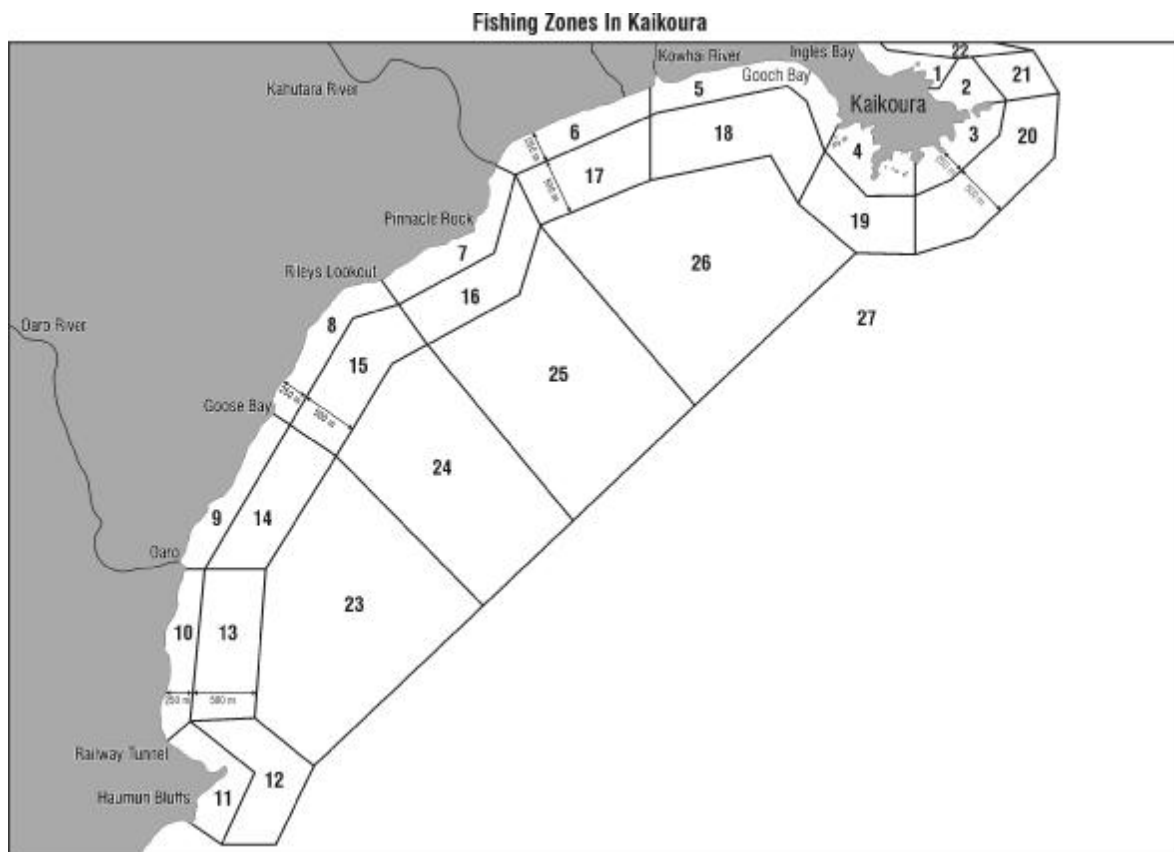
Recreational fishing survey zones used for the Kaikoura survey.

Recreational fishing survey zones used for the Bluff Harbour diary survey.

Recreational fishing survey zones used for the Otago Harbour diary survey.