

Roving Diver Fish Count

Access Table Design Structure for RovingDiverFishCount

Field Name	Data Type
SiteNumber	Number
IslandCode	Text
IslandName	Text
SiteCode	Text
SiteName	Text
SurveyYear	Number
SurveyDate	Date/Time
PermanentObserverNumber	Number
ExperienceLevel	Text
Species	Number
ScientificName	Text
CommonName	Text
Score	Number
Abundance	Text
Count	Number

Sample Size and Database Anomalies

This protocol was implemented in 1996 to assess fish populations at kelp forest monitoring sites. During the first year of sampling in 1996, fish not observed during the count were not entered into the database. Since 1997, a list of specific/core species has been created (Table 9) and these species are actively searched for during each fish count. If a species on the list is not observed, a zero is entered into the database indicating their absence during the RDFC.

From 1996 to 2002, the two indices of fish abundances that were recorded were score (a time based component) and abundance. The abundance of each fish species observed during the RDFC, for each observer, was placed into one of the following categories: (S)single = 1, (F)few = 2-10, (C)common = 11-100, and (M)many >100. Because many of the RDFC observers were very capable of counting fish and we were losing much information with the Abundance categories, we began recording whole fish counts in 2003 labeled as (Count) on the datasheets and database along with the abundance categories if the observers were experienced enough to count fish. In conjunction with this change in methodology the observers were rated as expert, intermediate or novice (see below definitions). The Abundance category codes are still entered into the database, and are based off of the Count field, so that pre-2002 RDFC data can be compared to post-2002 RDFC data. No Counts are available before 2003 and only some for 2003 because this protocol change was implemented in the middle of the field season. Where no Counts are available the data field is left blank/null.

Experience Levels: Each observer is determined to be expert, intermediate or novice (see definitions below). For intermediate and expert observers, score, abundance and count data will be entered into the database. For novice observers, only score and abundance values will be

entered with adult and juvenile totals combined under the “All” category if possible. The experience level will be noted on every datasheet.

Expert – an observer who can confidently identify and count all species of fish that commonly occur at the Channel Islands.

Intermediate – an observer who can identify and count all indicator species and most non-indicator species of fish (see indicator species list below). An observer is determined to be intermediate based on the discretion of the team leader.

Novice – an observer who can confidently identify all core RDFC indicator species (see Table 9.). Typically for a Novice we only record the abundance category, but if the lead biologist is confident the Novice is able to accurately count all of the core RDFC indicator species, the Counts can also be recorded.

Note: an observer should not conduct a RDFC if they do not know all of the core RDFC indicator species (Table 9.).

Although our Expert and Intermediate observers are confident in most fish species identification, there are a few species that are often difficult to identify and may have been recorded without 100% confidence. Most of the time we record these observations as a group (i.e. ronquil spp., fringehead spp. or kelpfish spp). However, some observations were recorded to species level and we have kept these in the database as this information may be useful. For data analysis, we recommend lumping individual species together. The following species of concern are:

- northern ronquil
- smooth ronquil
- stripedfin ronquil
- yellowfin fringehead
- scalyhead fringehead
- onespots fringehead
- sarcastic fringehead
- crevice kelpfish
- spotted kelpfish

If a non-indicator rockfish species is not specified as juvenile, then it is assumed to be adult. For non-core species (Table 9.) where we have definitions of juveniles, it is often difficult to determine adult versus juvenile surfperch spp. and although both categories are in the database, one may want to lump these for data analysis. We have kept the observations in the database as is, in the event that the information is useful later.

In 1996 when the RDFC protocol was initiated separate adult and juvenile categories were not used. Instead, all age groups and sexes were lumped into an “ALL” category. From 1997-1998 sexes were added for *Halichoeres semicinctus* and *Semicossyphus pulcher*, but we continued to lump adult and juveniles in an ALL category. In 1999 we added adult and juvenile categories to the RDFC for the same indicator fish we monitor on the fish transects (Table 26). For these species from 1999 to present we have adult, juvenile and ALL category. For fish species where juveniles have been observed, there are separate adult and juvenile categories. For all other fish species, only the common name is used without differentiation, all of these can be assumed to

have been adult. For example, wolf eels, California moray eels and bat rays in the database can be assumed to be adults.

Other Database Anomalies

Since 2003, there are a few cases where Intermediate or Expert observers did not count all or some fish and used the abundance categories. This usually occurs because an Expert or Intermediate observer will not be able to count some or all of the fish species. For example, if there are a lot of schooling fish the observer chose not to count the exact number of blackeye gobies on the bottom and estimated that number using the Abundance category, S, F, C or M.

Organisms Sampled Information

A selected number of species are actively searched for and are given the abundance count of zero if they are not observed. For this list of species, please see the protocol section of this handbook (Table 9.). All other fish species positively identified are sampled as well, but are not given a zero if not observed.

Sebastes serranoides (olive rockfish) juveniles are entered into the database as olive/yellowtail (OYT complex) rockfish juveniles. This count affects the “All” category and should be considered during data analysis. However, it is widely accepted that at the Channel Islands, these are most likely juvenile *S. serranoides* and not *S. flavidus* (yellowtail rockfish). In addition, young of the year *Sebastes melanops* (black rockfish) can be difficult to distinguish from olive/yellowtail rockfish juveniles but this species is extremely rare with the exception of a few observed at San Miguel and Santa Rosa Islands. It should be considered that there could also be a small number of juvenile *S. melanops* included in this category but we expect these to compose a very small proportion of the fish in this category. We acknowledge that a better name for this category may be OYB, but we had traditionally used OYT and didn’t believe the change warranted having nomenclature complications in 35 years of reporting.

Positive identification of young of year *S. atrovirens* (kelp rockfish), *S. caurinus* (copper rockfish), *S. carnatus* (gopher rockfish) and *S. chrysomelas* (black and yellow rockfish) shall be separated out and entered as such in the database. However, it is very difficult for many observers to distinguish between gopher and black and yellow rockfish so there is a black and yellow/gopher rockfish juvenile category that these shall be entered if they can not be identified to species. We recommend that in a general analysis of the data that one should consider combining both of these species as a grouped category due to possible identification difficulties. If kelp, copper, gopher and black and yellow rockfish can not be positively identified to species, they are to be entered as the KGB complex into the database which can include the kelp/gopher/black and yellow/copper rockfish young of year. We acknowledge that a better name for this category may be KGBC, but we had traditionally used KGB and didn’t believe the change warranted having nomenclature complications in 35 years of reporting.

The rockfish juvenile (*Sebastes* spp. juvenile) should consist of all unidentifiable species of juvenile rockfish, but observers should be trained to separate out the juvenile rockfish mentioned above so that this category has few of those species.

Rock wrasse juveniles were added to the core RDFC indicator species in 2007.

In 2008 “Opaleye, juvenile” was removed from the species list since juveniles are only found in the intertidal and none have ever been observed since monitoring began.

Coryphopterus nicholsii, blackeyed goby, was removed from the core RDFC indicator species in 2015. This decision was made because this species was sampled on 1 m² quadrats and was abundant enough in past years to obtain good density estimates. *Coryphopterus nicholsii* was re-added to RDFC in 2016 following a substantial decrease in abundance making 1 m² quadrat sample size too small to obtain adequate density estimates.

Sites Sampled Information

Table 29. Roving diver fish count sampling history.

Dates Available	Island Name	Site Code
1996 – Present	San Miguel	WL, HR
	Santa Rosa	JLNO, JLNO, RR
	Santa Cruz	GI, FH, PB, SA, YB
	Anacapa	AR, CC, LC
	Santa Barbara	SESL, AP, CAT
2003 – 2004	San Clemente	NWH, BSC, EP, HBC
2005 – Present	Santa Rosa	CP, TC, CSAW, SP
	Santa Cruz	DPM, PP, CVP, LS, PRF
	Anacapa	KH, EFC, BSB, LH
	Santa Barbara	WA, GC, SER
2006 – present	San Miguel	MM