

## OREGON DEPARTMENT OF FISH AND WILDLIFE DATA INVENTORY FOR BLUE ROCKFISH, DEACON ROCKFISH, CABEZON, AND LINGCOD FOR 2017 STOCK ASSESSMENTS

This report summarizes the Oregon Department of Fish and Wildlife (ODFW) data and information available for blue rockfish (*Sebastes mystinus*), deacon rockfish (*S. diaconus*), cabezon (*Scorpaenichthys marmoratus*), and lingcod (*Ophiodon elongatus*), which is not available via regional data repositories such as PacFIN and RecFIN. This includes age-length data, observer data, and certain periods of catch and effort data from the recreational fishery, and logbook data from the commercial nearshore fishery. Some commercial age-length data that is or will be available from PacFIN is also presented for comparison and to help evaluate the total age reading burden associated with assessing these species. These data will help to inform decision makers as species assessments are prioritized and scheduled for the 2017 stock assessment.

### *Logbook Data for Commercial Nearshore Fishery*

This fishery is a state-managed limited entry fishery that operates in nearshore waters and targets a variety of nearshore groundfish (including lingcod) to supply primarily the live fish market. Logbook requirements were implemented in 2004 in state regulations in conjunction with the limited entry program. Data can be aggregated at the trip- or set-level and include date, location, hours fished, number of hooks, and estimated pounds landed and discarded by species. This data was used to develop Catch-per-Unit-Effort (CPUE) indices of abundance for the first time during the 2015 assessments of black rockfish (*S. melanops*), China rockfish (*S. nebulosus*), and kelp greenling (*Hexagrammos decagrammus*), all of which included a commercial logbook index in the final base model. Substantial work was conducted to evaluate the integrity of the logbook data in that process, and resulting recommendations for improvement could be implemented for 2017 assessments. However, further evaluation may also be needed as quality can depend on the species in question and a wide range of additional considerations. Though confidential, logbook data is available upon request from ODFW.

### *Commercial Ages*

Table 1 shows the number of aged and unaged structures sampled from Oregon commercial fisheries by year for each species. Blue rockfish and deacon rockfish samples began to be collected for each species individually in 2010, but this data is currently only available on paper forms, therefore Table 1 shows blue rockfish and deacon rockfish samples in aggregate. ODFW will begin ageing blue rockfish and deacon rockfish samples from commercial fishery samples in the summer of 2016, and anticipates a substantial amount of age data for fishing years 2010-2015 will be available by the end of 2016. No commercial cabezon structures have been aged, and ODFW does not have capacity to age cabezon structures due to ongoing work to age blue rockfish and deacon rockfish. Access to commercial cabezon otoliths is limited because much of the catch is destined for live markets. A substantial number (6,103) of lingcod fin rays sampled from the commercial fisheries have been aged. However, none of the available samples

from fishing years 1997-1999 and 2008-2015 have been aged. Lingcod fin rays require sectioning and mounting prior to reading, and ODFW may have some limited capacity to assist with preparing fin rays.

### *Recreational Catch*

Recreational catch estimates have been derived from at least three distinct sampling programs, which have varied in occurrence, sampling protocols, and estimation methods over time: ODFW's Ocean Recreational Boat Survey (ORBS) and Shore and Estuary Boat Survey (SEBS) projects, and the federal Marine Recreational Fisheries Statistics Survey (MRFSS). The basis for catch estimates available from the Recreational Fishery Information Network (RecFIN) also vary over time (Figure 1). ORBS has collected data on sport catch and effort since the early 1970s (earlier years have been extrapolated using recreational fishing license sales). These data are available from 1973-2016 and represent ocean boat catches only. For 1973-1992, there are ORBS estimates of the number fish landed by species.

Since monitoring sport salmon catches was the primary focus of early ORBS, data on other species were aggregated to several categories. All rockfish species were part of a generic "rockfish" category and cabezon were part of a "miscellaneous" category, whereas lingcod data has always been its own species-specific category. Data from these categories were separated to species using species composition data taken during the same time period. The level at which species compositions were collected in ORBS has changed over the years. Figure 2 documents how trip type classifications and protocols for collecting species compositions have changed over time in ORBS.

These data would need to be expanded to account for unsampled ports and time periods for blue rockfish, deacon rockfish, and lingcod, while this work has already been completed for cabezon during the 2009 assessment. Catch estimates from ORBS for 1973-1992 are only available from ODFW upon request and are not available on RecFIN. Catch estimates from ORBS are the only estimates available from RecFIN for 1993-2016. Interview level data from the ORBS program, which has been used to develop indices of abundance for several previous assessments, is available from ODFW upon request for 2001-2016. ORBS data represent ocean boat data (charter and private) only. There are data on other fishing modes (shore, estuary boat) from MRFSS and SEBS, available on RecFIN for 1980-2003 and mid-2003 to mid-2005 respectively. However, shore and estuary catches are minor components of the total removals for these species. The availability and sources for each of these data types are summarized in Figure 1.

### *State Sport Observer Data*

The State Sport Observer (SSO) program was initiated as a pilot program in 2001, and became a permanent program in 2003. The program collects spatial catch, effort, and discard data at sea aboard charter vessels. Blue rockfish and deacon rockfish have not been identified to species until 2016 in this dataset. Recently, staff from ODFW and the Southwest Fishery Science Center developed a relational database with the data collected in this program (Monk et al. 2013). These data are confidential but available upon request through the ODFW. Data may be aggregated at the drift- or trip-level and consist of species specific numbers of fish caught and

discarded by observed anglers, as well as the lengths of discarded fish. There is also some information on gear type, including numbers of hooks, available at the trip level. The database has been used to develop Catch-per-Unit-Effort (CPUE) indices of abundance for several nearshore groundfish assessments. The number of drifts on which each species was encountered is summarized in Table 2.

Length data is only collected for discarded fish, but can be compared to retained catch length compositions recorded by the ORBS program. Initially, observers measured as many discarded fish as possible (2003-2009) but more recently, as many as possible were measured but no more than 10 fish per drift (2010 – present). All four species are discarded at substantive rates in the recreational fishery, blue rockfish and deacon rockfish due to their small average size, and cabezon and lingcod due to minimum size limits for both plus seasonal closures for cabezon (Table 2). Fish weights (W) are calculated in the database using fork length (L; equation:  $W = aL^b$ ), but are not directly measured at sea.

#### *Recreational Length-at-Age Data*

Age structures (and lengths) have been collected from recreational fisheries routinely since 1999 for lingcod and unspecified blue rockfish and since 2005 for cabezon. Blue rockfish and deacon rockfish have been sampled as individual species since 2008, prior to which the two species were sampled in aggregate as unspecified blue rockfish. The number of aged and unaged samples by species is summarized in Table 3 and Table 4. ODFW is currently ageing blue rockfish and deacon rockfish samples and a substantial number of ages for at least 2010-2015 will be available by the end of 2016. Cabezon samples remain largely unaged, although a limited number of were aged for the 2009 assessment, primarily to inform growth parameters. A substantial number of lingcod ages are available for 1999-2008, but more recent samples are unaged. ODFW does not currently have resources to conduct production ageing of cabezon or lingcod samples for 2017 assessments, although ODFW may be able to provide some assistance in preparing lingcod fin rays for ageing.

#### *Special Project and Research Biological Data*

Length, weight, age structures and other biological data are often collected by ODFW for “special projects” and research. Special project samples are typically fishery samples collected in a manner similar to commercial market samples or recreational age samples. They may represent targeted sampling for a specific purpose (e.g., estimating maturity curves), or samples that did not meet standard protocols for any number of reasons. Depending on how they were collected, a number of these samples may be integrated with standard fishery samples, especially where sample size is lacking. These samples are often associated with additional material such as maturity status, gonad samples, or tissue samples. The same types of information are also collected during targeted, fishery independent research projects which often mimic commercial or recreational fishing practices.

Table 5 tabulates the number of aged and unaged structures by species and source for special project and research samples. Samples designated as from an unknown source are typically fishery samples that lack a record of whether they were collected from a recreational or commercial fishery.

ODFW has published reports on length- and age-at-maturity for blue rockfish and deacon rockfish (Hannah et al. 2015) and cabezon (Hannah et al. 2009)

## References

Hannah, R.W, M.T.O. Blume, and J.E. Thompson. Length and age at maturity of female yelloweye rockfish (*Sebastes ruberrimus*) and cabezon (*Scorpaenichthys marmoratus*) from Oregon waters based on histological evaluation of maturity. ODFW Information Report # 2009-04. [http://www.dfw.state.or.us/MRP/publications/docs/Info200904\\_YlwEyeRF\\_Maturity.pdf](http://www.dfw.state.or.us/MRP/publications/docs/Info200904_YlwEyeRF_Maturity.pdf)

Hannah, R.W, D.W. Wagman, and L.A. Kautzi. Cryptic speciation in the blue rockfish (*Sebastes mystinus*): age, growth and female maturity of the blue-sided rockfish, a newly identified species, from Oregon waters. ODFW Information Report # 2015-01. [http://www.dfw.state.or.us/MRP/publications/docs/Info\\_Rept\\_2015-01\\_blue-sided\\_rf.pdf](http://www.dfw.state.or.us/MRP/publications/docs/Info_Rept_2015-01_blue-sided_rf.pdf)

Monk, M., E.J. Dick, T. Buell, L. Zumbrunnen, A. Dauble and D. Pearson. 2013. Documentation of a relational database for the Oregon Sport Groundfish Onboard Sampling program. NOAA Technical Memorandum NMFS-SWFSC-519. <http://swfsc.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFSC-519.pdf>.

**Figures**

Figure 1. Availability of recreational catch estimates and sample data by year and source

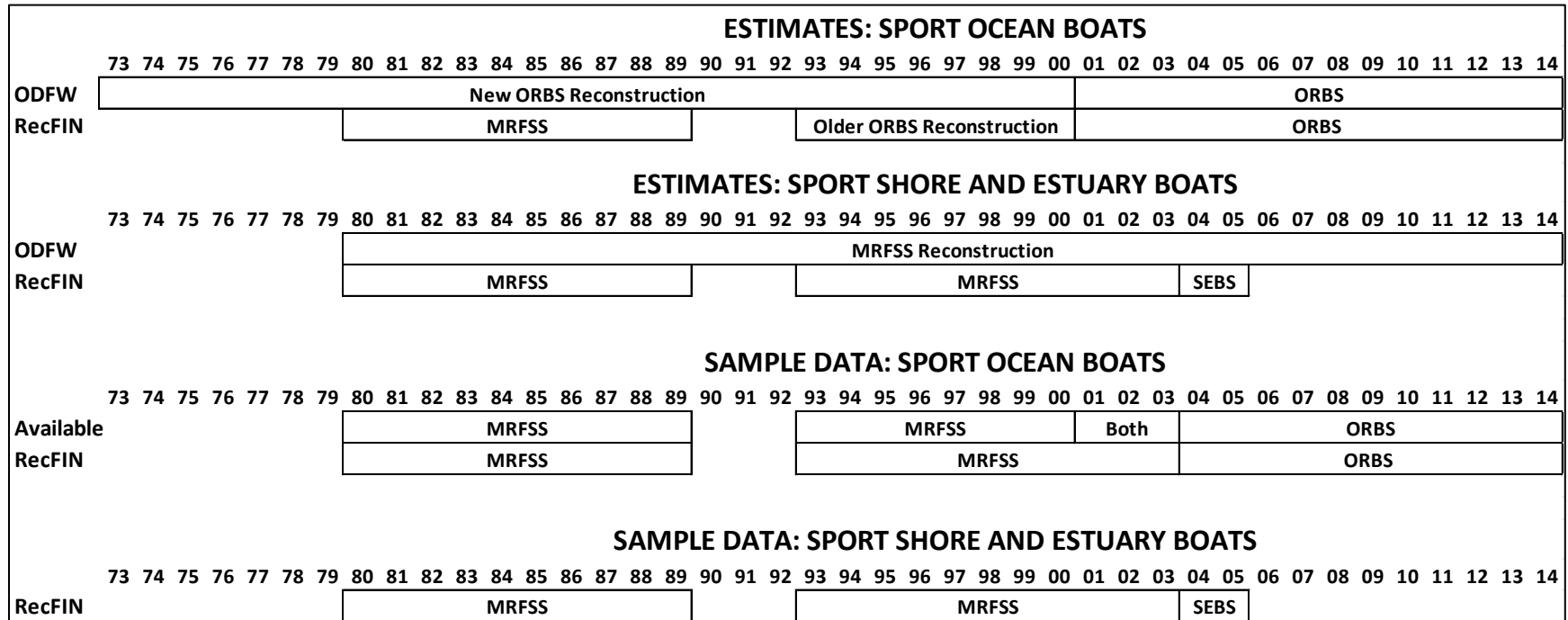
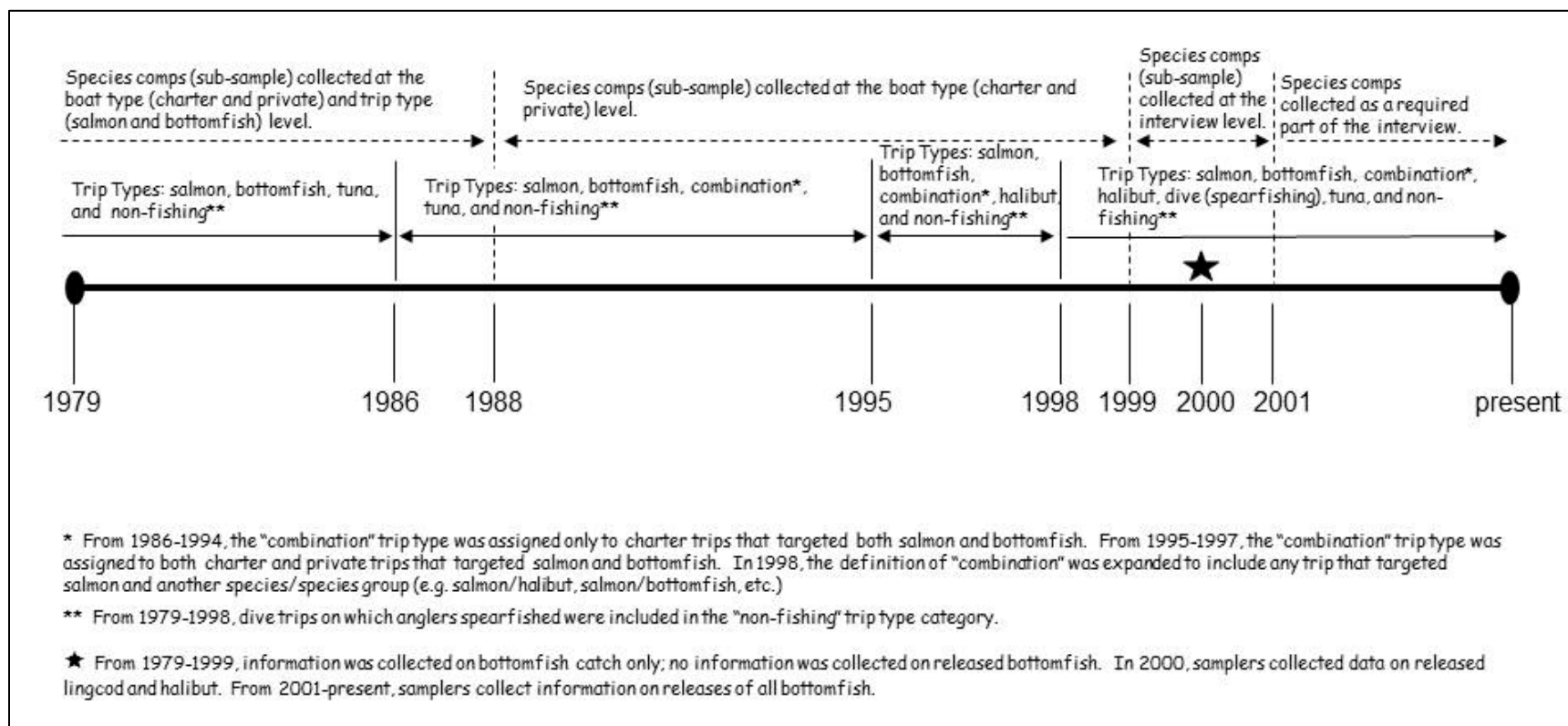


Figure 2: Timeline of bottomfish species composition collection and sampling, 1979 – present.



## Tables

Table 1: ODFW commercial market sample age structures for blue rockfish, deacon rockfish, cabezon, and lingcod.

Year	Unspecified Blue/Deacon rockfish		Cabezon		Lingcod	
	Aged	Unaged	Aged	Unaged	Aged	Unaged
1992	0	13	0	0	1,259	19
1993	0	0	0	0	1,306	10
1994	0	0	0	0	494	2
1995	0	0	0	0	330	75
1996	0	0	0	0	306	0
1997	0	0	0	0	0	744
1998	0	0	0	0	0	443
1999	0	0	0	0	0	663
2000	0	32	0	0	118	265
2001	0	0	0	0	383	28
2002	0	15	0	0	335	125
2003	0	64	0	8	322	1
2004	0	81	0	0	328	24
2005	0	32	0	0	238	24
2006	0	54	0	0	147	211
2007	0	160	0	1	374	35
2008	0	75	0	1	163	207
2009	0	150	0	21	0	226
2010	0	349	0	9	0	202
2011	0	505	0	40	0	241
2012	0	440	0	55	0	215
2013	0	649	0	34	0	281
2014	0	606	0	40	0	313
2015	0	155	0	0	0	149
<b>Total</b>	<b>0</b>	<b>3,736</b>	<b>0</b>	<b>209</b>	<b>6,103</b>	<b>4,503</b>

Table 2: Observed encounters in the SSO program for blue rockfish, deacon rockfish, cabezon, and lingcod for 2001-2014.

Species	Number Retained	Number Discarded	Drifts Encountered	Percent of Drifts Encountered	Number of discard lengths
Unspecified Blue/Deacon rockfish	4,732	2,368	3,460	24	2,051
Cabezon	624	273	1,324	9	256
Lingcod	3,066	2,898	4,845	34	2,415

Table 3: ODFW recreational age structures for blue rockfish and deacon rockfish. Shaded cells indicate the time period for which blue rockfish and deacon rockfish sampled as a single species.

Year	Blue Rockfish		Deacon Rockfish		Unspecified Blue/Deacon Rockfish	
	Aged	Unaged	Aged	Unaged	Aged	Unaged
1999					0	726
2000					0	566
2001					0	1,393
2002					0	739
2003					0	785
2004					0	501
2005					0	477
2006					0	899
2007					0	863
2008	0	66	0	826	0	34
2009	0	78	0	944	0	29
2010	0	65	0	842	0	47
2011	0	62	386	398	0	7
2012	121	0	408	457	0	10
2013	91	0	375	246	0	3
2014	132	0	371	250	0	2
2015	0	126	0	671	0	0
<b>Total</b>	<b>344</b>	<b>397</b>	<b>1,540</b>	<b>4,634</b>	<b>0</b>	<b>7,081</b>



Table 4: Collected ODFW recreational age structures for cabezon and lingcod.

Year	Cabezon		Lingcod	
	Aged	Unaged	Aged	Unaged
1999			688*	1,049
2000			803*	1,460
2001			646	823
2002			860	3
2003			805	13
2004			651	44
2005	73	0	479	59
2006	337	1	816	371
2007	231	0	798	250
2008	410	0	742	294
2009	0	433	0	1,031
2010	0	351	0	1,019
2011	0	334	0	1,059
2012	0	278	0	1,046
2013	0	153	0	1,032
2014	0	73	0	1,014
2015	0	93	0	1,029
<b>Total</b>	<b>1,051</b>	<b>1,716</b>	<b>7,288</b>	<b>11,596</b>

\*The majority of aged lingcod fin rays from years 1999 (n=510) and 2000 (n=539) are noted as “unreliable” in the database.

Table 5: ODFW special project and research age structure samples by type and year for blue rockfish, deacon rockfish, cabezon, and lingcod.

Species	Year	Commercial		Recreational		Research		Unknown	
		Aged	Unaged	Aged	Unaged	Aged	Unaged	Aged	Unaged
Unspecified Blue/Deacon rockfish	1998	0	0	0	0	2	867	0	0
	1999	0	0	0	0	0	183	0	0
	2000	0	13	0	0	50	691	0	0
	2001	0	8	0	0	0	156	0	0
	2002	0	12	0	0	0	0	0	0
	2005	0	297	0	0	0	0	0	0
	2006	0	4	0	0	0	0	0	0
	2007	0	3	0	86	0	0	0	0
	2008	0	17	0	0	0	0	0	0
	2009	0	2	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>356</b>	<b>0</b>	<b>86</b>	<b>52</b>	<b>1,897</b>	<b>0</b>	<b>0</b>	
Blue rockfish	2009	0	0	62	23	0	0	0	0
	2010	0	0	31	24	0	0	0	0
	2011	0	0	102	37	0	0	0	0
	2012	0	0	2	15	0	0	0	0
	2013	0	0	0	0	0	0	0	0
	2014	0	0	4	5	0	0	0	0
	2015	0	0	0	2	0	2	0	0
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>201</b>	<b>106</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>
Deacon rockfish	2009	0	0	48	135	0	0	0	0
	2010	0	0	76	36	0	0	0	0
	2011	0	0	66	59	0	0	0	0
	2012	0	0	12	37	0	0	0	0
	2013	0	0	2	0	0	0	0	0
	2014	0	0	67	6	0	0	0	0
	2015	0	0	0	2	0	0	0	0
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>271</b>	<b>275</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Table 5 Continued: ODFW special project and research age structure samples by type and year for blue rockfish, deacon rockfish, cabezon, and lingcod.

Species	Year	Commercial		Recreational		Research		Unknown	
		Aged	Unaged	Aged	Unaged	Aged	Unaged	Aged	Unaged
Cabezon	1999	0	0	0	0	0	13	0	0
	2000	0	38	0	0	0	4	0	0
	2001	0	140	0	0	0	52	0	0
	2002	0	94	0	0	0	0	0	0
	2003	0	0	124	137	0	0	0	49
	2004	0	272	53	77	0	0	0	4
	2005	0	180	46	119	0	0	0	0
	2006	0	6	93	156	0	0	0	0
	2007	0	0	79	373	0	0	0	29
	2008	0	127	74	217	0	0	0	0
	2009	0	5	0	1	0	0	0	0
	2010	0	71	0	0	0	0	0	0
	2011	0	105	0	0	0	13	0	0
	2012	0	92	0	0	0	0	0	0
	2013	0	63	0	0	0	0	0	0
	<b>Total</b>	<b>0</b>	<b>1,193</b>	<b>469</b>	<b>1,080</b>	<b>0</b>	<b>82</b>	<b>0</b>	<b>82</b>
Lingcod	1997	0	50	0	0	0	0	0	0
	1998	0	27	0	0	0	0	0	0
	2000	0	5	0	0	0	0	0	0
	2001	0	0	0	0	0	13	0	0
	2003	18	0	0	0	0	0	0	0
	2007	60	30	0	0	0	0	0	0
	2008	0	15	0	0	0	0	0	0
		<b>Total</b>	<b>78</b>	<b>127</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>0</b>