

DRAFT Gulf of Mexico Red Snapper Observed Catch at Age

by

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Data were compiled from a variety of sources to develop a catch-at-age matrix by year class (0 to 15+) and year (1984 to 2003). The following files provided the data used in these analyses, with sources in parentheses:

- PCLAB RS Data for Miami turner (Panama City lab)—only used recreational modes;
- rs_agedata (Ching-Ping Chih)—commercial data tested for randomness and balanced gear;
- gfin02rec (Steve Turner)—GulfFIN recreational data;
- rs_fin02 (Chih)—GulfFIN commercial data;
- gfin03rec (Turner)—GulfFIN recreational data;
- rs_fin03 (Chih)—GulfFIN commercial data.

The files processed by Chih identified which samples met randomization and matched gear criteria. In all files, records were eliminated if they were characterized by:

- No age
- No date
- Not random, unmatched gear (as determined by Chih)
- Modes: scientific survey, tournament, unspecified
- Gears: spear, trawl, unspecified

This procedure left several recreational and one commercial mode and two gears: handline and longline.

All recent GulfFIN data had not yet been converted into annual ages. Ages were calculated based on several sources of information, including the number of rings on otoliths, the character of the otolith margin, and the sampling date. The general formula for annual ages was:

$$Age = trunc(\# rings - 0.5 + \frac{sampledate - 1/1}{days / yr}),$$

with one added if the sample was taken between January and June (inclusive) and the otolith's edge was opaque (a margin score of 6 for Louisiana, 4 for other states). The first reader's otolith characterizations were used.

Data were combined into several strata. Mode/gear combinations included: commercial handline, commercial longline, recreational headboat handline, and recreational private boat handline (both private and charter).

Samples were also stratified geographically. Initially, samples were identified as west (W), northeast (NE), or southeast (SE). If latitude and longitude of capture were recorded in the record, these data were used preferentially. If longitude were greater than 90°W, a sample was placed in the western stratum. If longitude were less than 85°W, a sample was placed in the southeast stratum. If a sample had a longitude greater than or equal to 85°W but less than 89°W, it was placed in the northeast stratum. Finally, for any sample whose longitude was greater than or equal to 89°W but less than or equal to 90°W, then the latitude determined the geographic stratum. If the latitude was less than $(21.6/60)*(longitude-89)+29$, it was placed in the western stratum. If the latitude exceeded this expression, it was placed in the northeast stratum. If it was equal, other geographic information was used to determine its stratum.

If latitude and longitude information were missing or inconclusive, then shrimp grid numbers were used if they had been recorded. In this case, grids 1-7 made up the southeast stratum, 8-12 made up the northeast stratum, and 13-22 made up the western stratum.

If these criteria had not yet identified the geographic stratum of a sample, the state landed was used. Any sample landed in Texas or Louisiana was assigned to the western stratum, while any sample landed in Florida or Alabama was assigned to the northeastern stratum (note that Florida was assigned as such because the majority of catch in the state comes from what was identified as northeast by the above criteria). Samples landed in Mississippi and caught recreationally were assigned to the northeast stratum while those caught commercially were assigned to the western stratum. This treatment was based on comparisons of samples with more precise geographic information (grid-based or lat-long-based). Of these samples, all recreationally caught fish landed in Mississippi came from northeastern grids while most (315 of 374) commercially caught fish came from western grids.

Some of these strata were combined when developing final catch at age matrices. The two recreational modes were combined into a recreational handline stratum through an average of the observed age composition of each sector weighted by that sector's landings. Additionally, southeast and northeast samples were combined. They were treated equally as eastern samples for all mode/gear combinations but commercial handline. For commercial handline, an average was taken of southeast and northeast catch at age weighted by landings to develop an eastern age composition of catches. In a few cases, catch at age information was available for one or more years for one mode/gear/geography stratum but not the other being combined. In those cases, the missing values were filled with the average catch at age across all available years.

Results are presented in the following tables and figures.

Commercial Handline Sample Sizes

Year	NE	SE	W	Grand Total
1991	95			95
1992	101		214	315
1993	145	2	342	489
1994	160		498	658
1995	45		144	189
1996	9			9
1997	32			32
1998	114		1246	1360
1999	239	21	1986	2246
2000	563		1424	1987
2001	866	2	1327	2195
2002	836	9	3046	3891
2003	256		154	410
Grand Total	3461	34	10381	13876

Commercial Longline Sample Sizes

Year	E	W	Grand Total
1991	12		12
1992	15		15
1993	30	29	59
1994	8		8
1995	19		19
1996	6		6
1997	10		10
1998	25	348	373
1999	102	76	178
2000	131	298	429
2001	91	179	270
2002	179	551	730
Grand Total	628	1481	2109

Recreational Headboat Sample Sizes

Year	E	W	Grand Total
1991	20	102	122
1992	78	26	104
1993	262	913	1175
1994	270	388	658
1995	12	10	22
1996	117		117
1997	97		97
1998	665	982	1647
1999	366	267	633
2000	141	252	393
2001	223	74	297
2002	219	207	426
2003		101	101
Grand Total	2470	3322	5792

Recreational Private Boat Sample Sizes

Year	E	W	Grand Total
1980	325		325
1991	239	526	765
1992	354	487	841
1993	433	213	646
1994	427		427
1995	362		362
1996	101		101
1997	56		56
1998	1213	355	1568
1999	1240	172	1412
2000	506	6	512
2001	390		390
2002	2172	567	2739
2003	2282	802	3084
Grand Total	10100	3128	13228

Commercial Handline East

Year	Age0	Age1	Age2	Age3	Age4	Age5	Age6	Age7	Age8	Age9	Age10	Age11	Age12	Age13	Age14	Age15+
1991	0.000	0.116	0.585	0.167	0.071	0.045	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1992	0.000	0.010	0.554	0.225	0.149	0.012	0.012	0.010	0.010	0.019	0.000	0.000	0.000	0.000	0.000	0.000
1993	0.000	0.030	0.392	0.439	0.084	0.024	0.018	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.006
1994	0.000	0.000	0.381	0.295	0.180	0.087	0.046	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.006
1995	0.000	0.158	0.463	0.240	0.077	0.034	0.007	0.000	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.000
1996	0.000	0.000	0.636	0.231	0.114	0.016	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1997	0.000	0.000	0.296	0.492	0.069	0.079	0.034	0.000	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1998	0.000	0.000	0.046	0.615	0.215	0.095	0.013	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999	0.000	0.000	0.123	0.462	0.303	0.073	0.032	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.002	0.265	0.350	0.261	0.082	0.026	0.008	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2001	0.000	0.017	0.167	0.322	0.223	0.202	0.040	0.007	0.007	0.006	0.003	0.001	0.000	0.000	0.000	0.004
2002	0.000	0.013	0.398	0.343	0.142	0.049	0.045	0.005	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.002
2003	0.000	0.025	0.257	0.394	0.125	0.084	0.042	0.014	0.007	0.004	0.004	0.011	0.004	0.000	0.000	0.032

Commercial Handline West

Year	Age0	Age1	Age2	Age3	Age4	Age5	Age6	Age7	Age8	Age9	Age10	Age11	Age12	Age13	Age14	Age15+
1992	0.000	0.005	0.575	0.173	0.107	0.051	0.051	0.019	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.009
1993	0.000	0.023	0.339	0.444	0.135	0.029	0.018	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009
1994	0.000	0.038	0.315	0.303	0.235	0.056	0.022	0.014	0.006	0.002	0.002	0.000	0.000	0.000	0.000	0.006
1995	0.000	0.007	0.306	0.403	0.132	0.118	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000
1998	0.000	0.008	0.053	0.416	0.277	0.142	0.037	0.030	0.017	0.005	0.003	0.001	0.002	0.000	0.000	0.010
1999	0.000	0.002	0.176	0.401	0.249	0.103	0.047	0.012	0.005	0.003	0.001	0.000	0.000	0.000	0.000	0.002
2000	0.000	0.007	0.265	0.381	0.200	0.089	0.037	0.013	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.001
2001	0.000	0.015	0.164	0.307	0.239	0.145	0.074	0.029	0.014	0.007	0.002	0.002	0.000	0.001	0.000	0.003
2002	0.007	0.105	0.364	0.250	0.140	0.068	0.035	0.015	0.006	0.002	0.002	0.001	0.000	0.001	0.000	0.004
2003	0.006	0.071	0.364	0.338	0.123	0.045	0.013	0.006	0.006	0.000	0.000	0.006	0.000	0.000	0.000	0.019

Commercial Longline East

Year	Age0	Age1	Age2	Age3	Age4	Age5	Age6	Age7	Age8	Age9	Age10	Age11	Age12	Age13	Age14	Age15+
1991	0.000	0.083	0.667	0.083	0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000
1992	0.000	0.000	0.000	0.267	0.067	0.333	0.067	0.133	0.000	0.000	0.067	0.000	0.000	0.000	0.000	0.067
1993	0.000	0.000	0.133	0.200	0.367	0.100	0.033	0.067	0.000	0.000	0.033	0.000	0.000	0.033	0.000	0.033
1994	0.000	0.000	0.125	0.375	0.250	0.125	0.000	0.000	0.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1995	0.000	0.000	0.053	0.421	0.421	0.053	0.000	0.000	0.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1996	0.000	0.000	0.000	0.000	0.333	0.500	0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1997	0.000	0.100	0.200	0.400	0.200	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1998	0.000	0.000	0.000	0.040	0.240	0.400	0.240	0.080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999	0.000	0.000	0.020	0.363	0.304	0.196	0.088	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.010
2000	0.000	0.000	0.008	0.069	0.153	0.153	0.115	0.076	0.046	0.023	0.031	0.031	0.023	0.015	0.015	0.244
2001	0.000	0.000	0.022	0.099	0.308	0.352	0.165	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.011
2002	0.000	0.028	0.078	0.196	0.201	0.223	0.140	0.039	0.022	0.011	0.011	0.000	0.000	0.000	0.006	0.045

Commercial Longline West

Year	Age0	Age1	Age2	Age3	Age4	Age5	Age6	Age7	Age8	Age9	Age10	Age11	Age12	Age13	Age14	Age15+
1993	0.000	0.034	0.931	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1998	0.000	0.000	0.009	0.089	0.144	0.190	0.069	0.052	0.063	0.052	0.066	0.049	0.043	0.043	0.026	0.106
1999	0.000	0.000	0.263	0.539	0.118	0.066	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.003	0.027	0.064	0.195	0.225	0.174	0.117	0.044	0.037	0.034	0.020	0.013	0.003	0.044
2001	0.000	0.000	0.000	0.017	0.061	0.240	0.179	0.117	0.078	0.073	0.039	0.039	0.028	0.022	0.017	0.089
2002	0.004	0.074	0.258	0.127	0.109	0.053	0.082	0.058	0.034	0.036	0.025	0.015	0.018	0.018	0.015	0.074

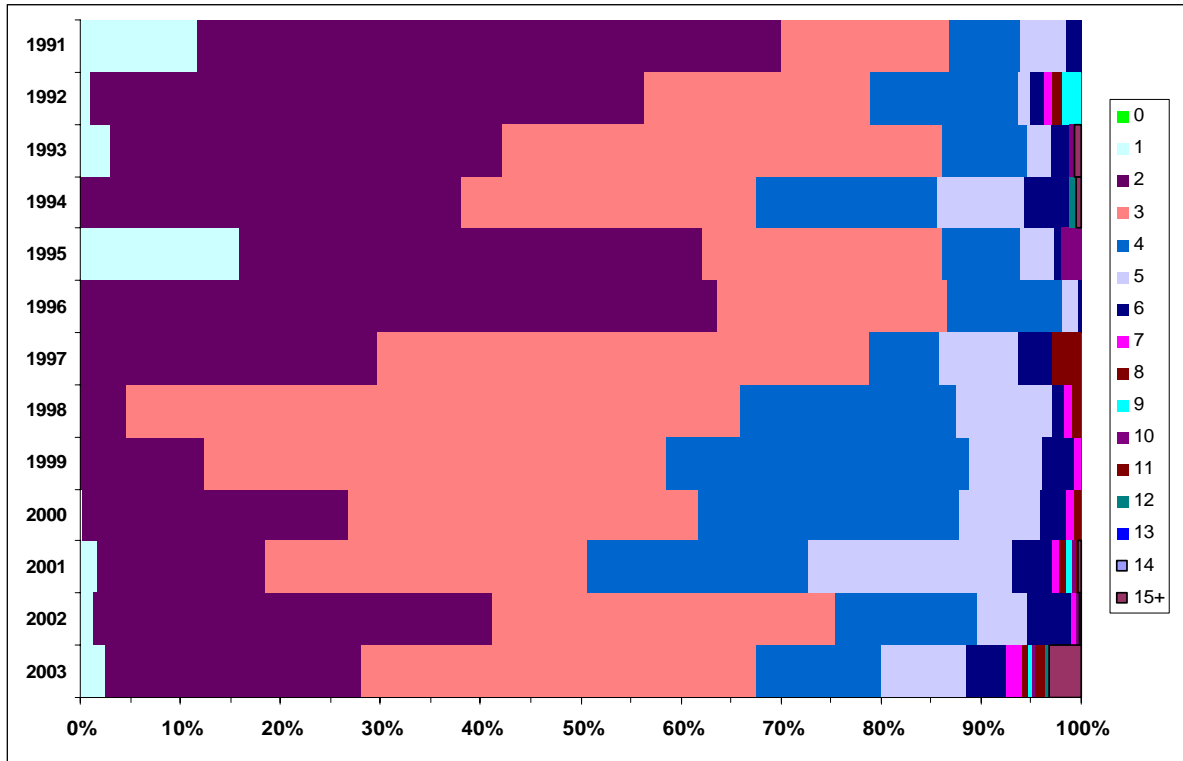
Recreational Handline East

Year	Age0	Age1	Age2	Age3	Age4	Age5	Age6	Age7	Age8	Age9	Age10	Age11	Age12	Age13	Age14	Age15+
1991	0.000	0.082	0.524	0.330	0.053	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1992	0.000	0.172	0.289	0.413	0.093	0.022	0.007	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1993	0.000	0.075	0.457	0.283	0.124	0.045	0.004	0.009	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000
1994	0.000	0.074	0.348	0.333	0.142	0.070	0.027	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1995	0.003	0.196	0.232	0.250	0.160	0.085	0.043	0.008	0.005	0.013	0.000	0.000	0.000	0.000	0.000	0.005
1996	0.019	0.141	0.569	0.173	0.031	0.010	0.009	0.019	0.000	0.028	0.000	0.000	0.000	0.000	0.000	0.000
1997	0.000	0.000	0.733	0.110	0.088	0.018	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1998	0.000	0.014	0.307	0.491	0.158	0.022	0.005	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999	0.000	0.002	0.203	0.436	0.321	0.028	0.007	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
2000	0.000	0.040	0.494	0.337	0.113	0.014	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2001	0.000	0.076	0.557	0.249	0.092	0.017	0.005	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
2002	0.001	0.048	0.263	0.406	0.175	0.060	0.028	0.013	0.002	0.000	0.000	0.000	0.000	0.001	0.000	0.001
2003	0.000	0.026	0.253	0.407	0.225	0.048	0.025	0.011	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.002

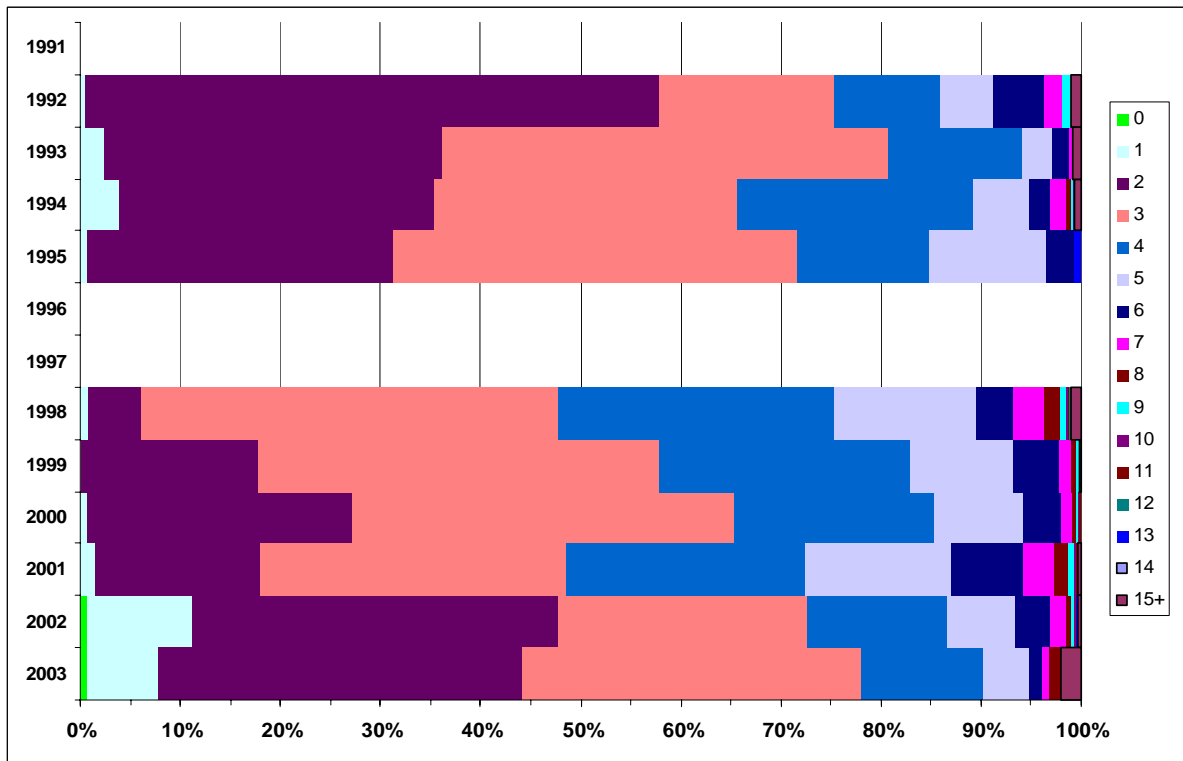
Recreational Handline West

Year	Age0	Age1	Age2	Age3	Age4	Age5	Age6	Age7	Age8	Age9	Age10	Age11	Age12	Age13	Age14	Age15+
1991	0.000	0.002	0.593	0.310	0.049	0.026	0.015	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1992	0.000	0.024	0.367	0.451	0.082	0.028	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020
1993	0.000	0.067	0.633	0.229	0.054	0.013	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1994	0.000	0.028	0.420	0.286	0.158	0.054	0.018	0.014	0.001	0.000	0.010	0.000	0.000	0.000	0.000	0.010
1995	0.000	0.014	0.704	0.145	0.066	0.021	0.012	0.014	0.001	0.000	0.010	0.000	0.000	0.000	0.000	0.011
1998	0.000	0.029	0.177	0.332	0.259	0.114	0.050	0.022	0.007	0.002	0.001	0.001	0.000	0.000	0.000	0.007
1999	0.000	0.009	0.106	0.417	0.311	0.093	0.040	0.008	0.005	0.003	0.000	0.002	0.000	0.000	0.000	0.008
2000	0.000	0.018	0.300	0.233	0.043	0.040	0.040	0.119	0.003	0.003	0.097	0.002	0.000	0.000	0.000	0.102
2001	0.000	0.021	0.311	0.237	0.148	0.074	0.078	0.061	0.008	0.007	0.017	0.013	0.000	0.000	0.000	0.024
2002	0.003	0.110	0.337	0.339	0.116	0.042	0.021	0.018	0.003	0.002	0.000	0.000	0.000	0.002	0.003	0.002
2003	0.000	0.019	0.449	0.284	0.146	0.048	0.020	0.008	0.018	0.002	0.000	0.001	0.001	0.002	0.001	0.001

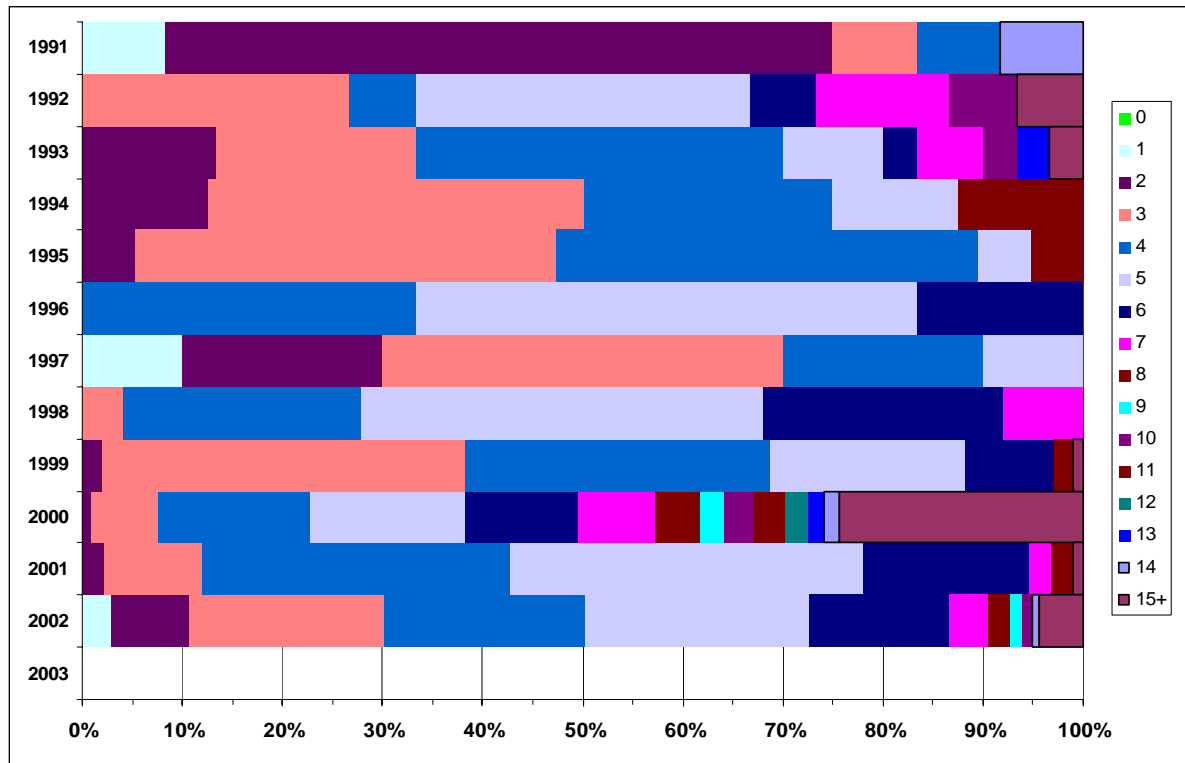
Commercial Handline East



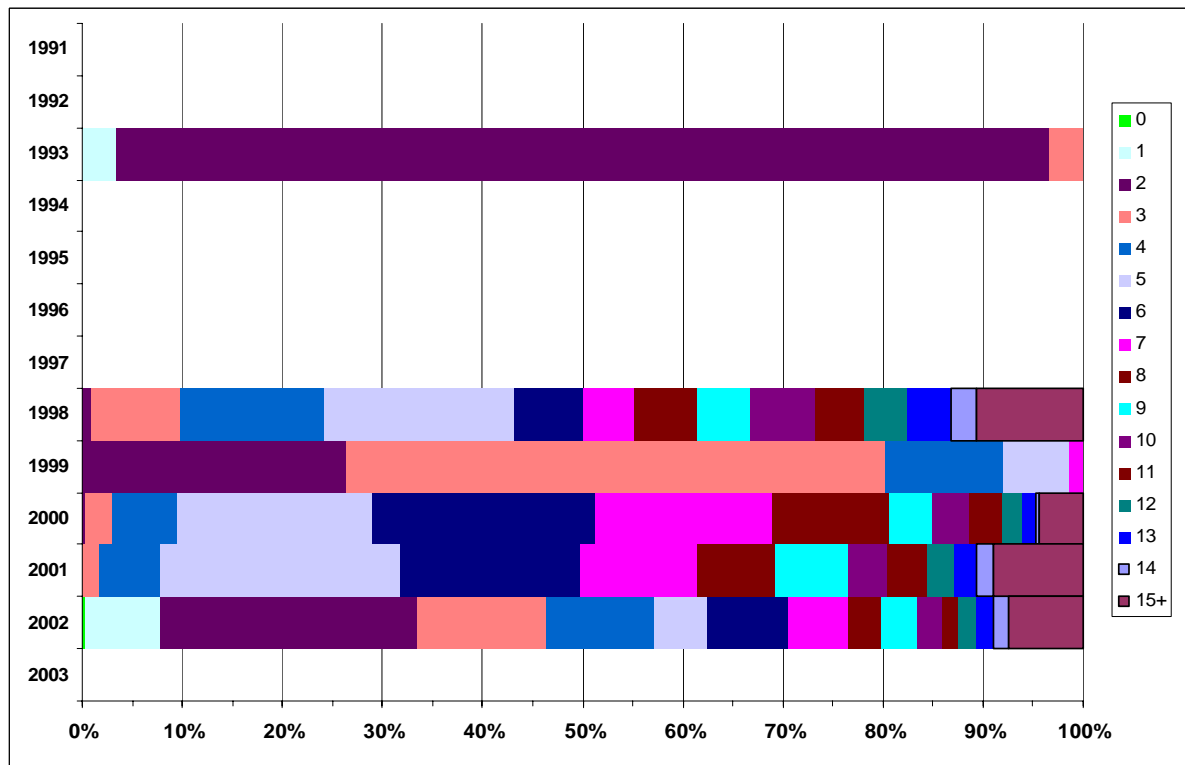
Commercial Handline West



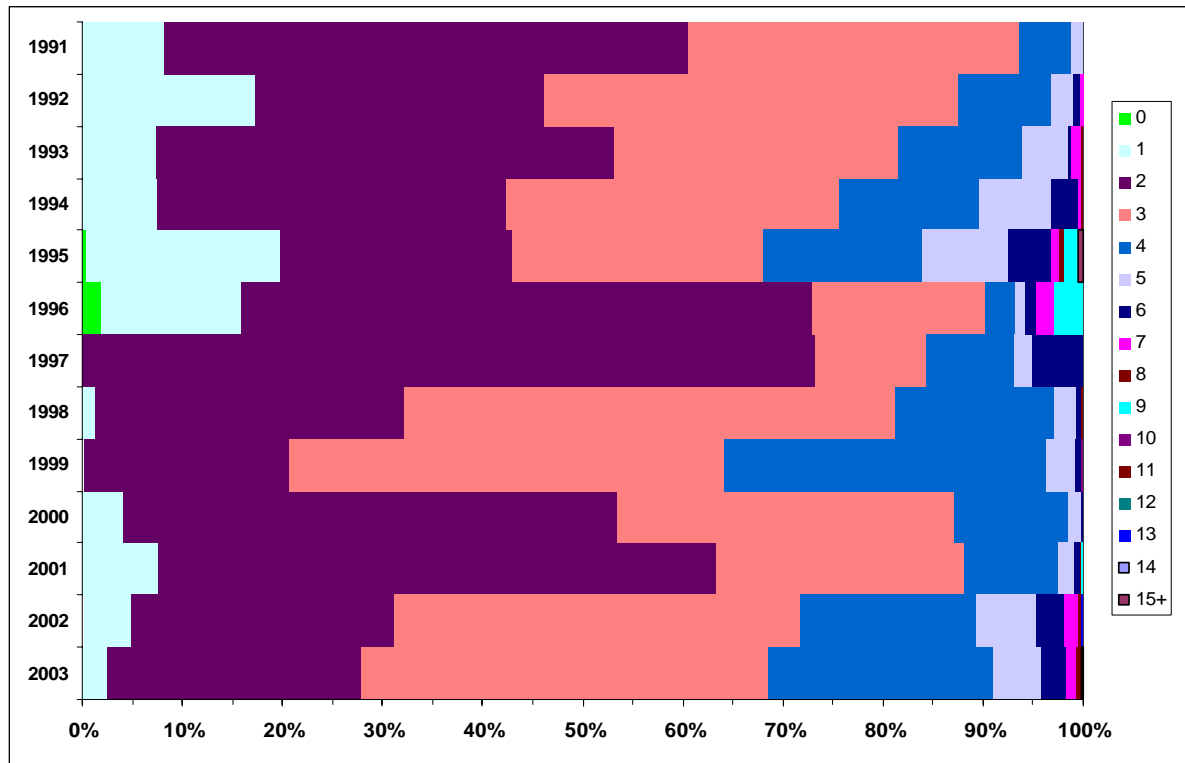
Commercial Longline East



Commercial Longline West



Recreational Handline East



Recreational Handline West

