Appendix 1 – Gulf of Alaska and Bering Sea/Aleutian Islands SAFE Reports

Assessment of Grenadiers in the Gulf of Alaska, Eastern Bering Sea, and Aleutian Islands (Executive Summary)

by
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Introduction

Grenadiers are presently considered "nonspecified" by the NPFMC, which means they are not part of the groundfish fishery management plans (FMPs) for either the Gulf of Alaska (GOA) or the Bering Sea/Aleutian Islands (BSAI). Therefore, there are no limitations on catch or retention and no official reporting requirements. However, in 2005 a joint management plan amendment for "other species" was proposed which included an option to change grenadiers to a "specified" status, in which case they would be included as managed groundfish species in the FMPs. In response to this possibility, an assessment of grenadiers in Alaska was prepared for the first time as an appendix to the 2006 SAFE report (Clausen 2006). In 2008, a substantial amount of new information became available for giant grenadier (*Albatrossia pectoralis*; the main species of interest in the group); therefore, a full update of the grenadier assessment was completed (Clausen and Rodgveller 2008). Because the 2008 report provided a detailed assessment, and because an official assessment of "nonspecified" fish such as grenadiers is not required by the NPFMC, it was decided that a brief, Executive Summary report for grenadiers would be sufficient for 2009. In this report, we present new survey information and updated catch estimates. We also use the new survey data to compute revised values for recommended OFL and ABC.

New Survey Information

New survey information for giant grenadier in 2009 includes biomass estimates in the GOA based on the recently completed 2009 trawl survey, and results of the 2009 NMFS longline survey in the GOA and the eastern Bering Sea (EBS). The trawl survey biomass estimate for giant grenadier in the GOA in 2009 was 718,320 mt. This estimate is considerably higher than the 2005 and 2007 survey estimates, which were 587,346 and 487,987 mt, respectively. In the 2009 longline survey, the relative population weight (RPW; an index of relative biomass) for giant grenadier in the GOA was 1,210,775. This is an increase of 16% compared to the 2008 RPW. The RPW for giant grenadier in the EBS was 795,883, 64% higher than the last year this area was surveyed in 2007, and the second highest value in the biennial time series for the EBS extending back to 1997. The 2009 longline survey in the EBS was greatly affected by killer whale depredation at many stations. Consequently, much of the data had to be omitted from the RPW analysis, and the results for sablefish in this area appear to be invalid[1]. However, the RPW values for giant grenadier in the EBS in 2009 seem reasonable, and killer whales are not believed to affect catches of giant grenadiers as much as they do sablefish. Therefore, we are treating the 2009 longline survey results for giant grenadier in the EBS as valid, although these results should be used with caution.

[1] C. Lunsford, National Marine Fisheries Service, Alaska Fisheries Science Center, Auke Bay Laboratories, 17109 Point Lena Loop Rd., Juneau, AK 99801. Pers. comm. October 2009.

Updated Catches

Although there are no "official" catch data for grenadiers, catches have been estimated based on observer data, or in years since 2003, the NMFS Alaska Region Catch Accounting System. Updated catches (mt) through October 7, 2009 are listed in the following table:

	Eastern Bering Sea	Aleutian Islands	Gulf of Alaska	Total
1997	2,964	2,887	12,029	17,881
1998	5,011	1,578	14,683	21,272
1999	4,505	2,883	11,388	18,776
2000	4,067	3,254	11,610	18,931
2001	2,294	1,460	9,685	13,439
2002	1,891	2,807	10,479	15,177
2003	2,869	3,558	12,253	18,680
2004	2,224	1,180	12,167	15,571
2005	2,640	1,784	7,251	11,675
2006	2,079	2,219	8,756	13,053
2007	1,625	1,547	9,272	12,444
2008	2,674	2,486	11,837	16,997
2009	2,564	3,176	5,661	11,401
mean	2,877	2,371	10,544	15,792

Although these catches are for all grenadier species combined, it is likely that giant grenadier comprise nearly all the catch (Clausen and Rodgveller 2008). Compared with the catch data in the last year's grenadier assessment, all the catches for 2003-2007 have changed, but not enough to be significant, and the 2008 catches are now complete. The 2009 catches are incomplete and final catches are expected to be considerably higher.

OFL and ABC Determination

In the previous assessments for grenadiers, we recommended a tier 5 approach for determining OFL and ABC, and we continue to recommend this approach for the revised OFLs and ABCs in this summary. The tier 5 computations have been based on giant grenadier only and have excluded other grenadier species because virtually none of the other species are caught in the commercial fishery and relatively few are taken in fish surveys. Therefore, in the tier 5 determinations, giant grenadier is serving as a proxy for the entire grenadier group. The two input parameters required for tier 5 are reliable estimates of biomass (*B*) and a reliable estimate of the natural mortality rate (*M*). In the 2008 assessment, we recommended a new *M* of 0.078 for giant grenadier based on an aging and maturity study that we had recently completed. Biomass estimates in this assessment for giant grenadier in the EBS and GOA were calculated based on the average of the three most recent deep-water (to 1,000-1,200 m) trawl surveys in each area. No trawl surveys in the Aleutian Islands (AI) have sampled depths >500 m since 1986, so an indirect method was used to determine biomass of giant grenadier in this region. This indirect method is based on using a combination of data from the trawl surveys and the NMFS longline survey. Although trawl surveys in the AI have not sampled deep water for many years, since 1996 the longline survey has surveyed this area every other year. Using the biomass-weighted index values (RPWs) in the longline survey, overall biomass ratios for giant grenadier can be computed between the AI and EBS and the AI and the GOA for the years since 1996-1997 (when the longline survey was expanded from the GOA to also cover the EBS

and the AI). Each of these biomass ratios can then be multiplied by the corresponding trawl survey biomass estimates in either the EBS or GOA to yield two hypothetical biomass estimates for the AI. In the 2008 assessment, we averaged the two biomass estimates to yield the final AI biomass estimate used in the OFL and ABC computations. At present, we believe this is the best approach for determining AI biomass for giant grenadier, while acknowledging that the estimate is much less certain than the direct estimates in the EBS and GOA.

Based on the new survey information from 2009, revised values for giant grenadier biomass, OFL, and ABC are summarized in the table below. The values are computed using procedures identical to those used in the 2008 assessment. Values for the EBS remain the same as in the 2008 assessment because there is no new trawl survey information for this area. For the GOA, the biomass is now based on the average of the 2005, 2007, and 2009 trawl surveys (the three most recent trawl surveys in this area). For the AI, the ratio of longline RPW in the AI vs. the EBS is 2.41 for the years 1997-2009. Applying this ratio to the EBS biomass of 518,778 mt in the table yields a biomass of 1,249,004 mt in the AI. An alternative biomass for the AI can be computed by multiplying the ratio of longline RPW in the AI vs. the GOA for the years 1996-2009 (1.39) times the GOA biomass of 597,884 in the table, which yields a biomass of 806,270 mt in the AI. The average of these two estimates, 1,027,637 mt, is our new recommended biomass for the AI.

Updated biomass, OFL, and ABC recommendations for giant grenadier (biomass, OFL, and ABC are in mt). Under Tier 5, F_{OFL}=M= 0.078, OFL=biomass x M, maximum permissible F_{ABC}=0.75 x M= 0.0585, maximum permissible ABC=max permF_{ABC} x biomass.

Area	Biomass	Natural mortality M	F_{OFL}	OFL	Maximum permissible F_{ABC}	F_{ABC}	ABC
EBS	518,778	0.078	0.078	40,465	0.0585	0.0585	30,349
AI	1,027,637	0.078	0.078	80,156	0.0585	0.0585	60,117
GOA	597,884	0.078	0.078	46,635	0.0585	0.0585	34,976
Total	2,144,299			167,255			125,441

These values are compared to the recommended values in the 2008 assessment for grenadiers (biomass, OFL, and ABC are in mt):

	2008 Assessment				2009 Update			
Area	Biomass	Natural mortality M	OFL	ABC	Biomass	Natural mortality M	OFL	ABC
EBS	518,778	0.078	40,465	30,349	518,778	0.078	40,465	30,349
AI	979,256	0.078	76,382	57,286	1,027,637	0.078	80,156	60,117
GOA	488,414	0.078	38,096	28,572	597,884	0.078	46,635	34,976
Total	1,986,448	0.078	154,943	116,207	2,144,299	0.078	167,255	125,441

Recommendation to Include Grenadiers in the FMPs as species that are "in the fishery"

Previously, we recommended that although grenadiers are "nonspecified" and thus not included in either the BSAI or GOA FMPs, it would be much more appropriate for them to be in the "other species" category. The "other species" category has been defined by the NPFMC as species that have "only slight economic value and are generally not targeted upon, but which are either significant components of the ecosystem or have economic potential". In contrast, "nonspecified" species are a "residual category of species and species groups of no current or foreseeable economic value or ecological importance, which are taken in the groundfish fishery as accidental bycatch and are in no apparent danger of depletion" and for which "virtually no data exists (that) would allow population assessments". Based on these definitions, grenadiers clearly belong in the "other species" group. Because of their abundance on the continental slope, giant grenadier are of great ecological importance in this habitat, and they also hold economic potential. In addition, there now exists considerable information on giant grenadier that can be used for population assessment. The information is such that we may be able to move grenadiers from tier 5 to tier 4 in future assessments. Therefore, we were very supportive of the management plan amendment proposal to move grenadiers from the "nonspecified" to the "other species" group.

In June 2009, work started on a new proposed amendment by the NPFMC that if adopted, could affect the management status of grenadiers. The new proposed amendment supersedes the older 2005 proposed amendment. The new amendment is in response to guidelines on "Annual Catch Limits" (ACLs) developed by NMFS to comply with the reauthorized version of the Magnuson-Stevens Fishery Conservation and Management Act. For the new proposed amendment, we recommend that grenadiers be included as species that "are in the fishery", in which ACLs and accountability measures are required. Although seven species of grenadiers are reported to occur in Alaskan waters, four are abyssal in their distribution and have never been encountered in commercial or survey catches. Hence, we also recommend that only the remaining three species (giant, Pacific, and popeye), which have by taken by the fishery and in surveys, be included in a "grenadier complex".

References

Clausen, D. M. 2006. Grenadiers in the Gulf of Alaska, eastern Bering Sea, and Aleutian Islands. In Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska and Bering Sea/Aleutian Islands regions, Appendix F, p. 563-600. North Pacific Fishery Management Council, 605 W 4th Ave., Suite 306, Anchorage AK 99501.

Clausen, D. M., and C. J. Rodgveller. 2008. Assessment of grenadiers in the Gulf of Alaska, eastern Bering Sea, and Aleutian Islands. In Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska and Bering Sea/Aleutian Islands regions, Appendix 1, p. 613-656. North Pacific Fishery Management Council, 605 W 4th Ave., Suite 306, Anchorage AK 99501.