

# GOA Flathead sole

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## Executive Summary

A model for flathead sole in the Gulf of Alaska was developed for predicting abundance and ABC levels. Analysis of maturity by age and length was completed for Gulf of Alaska flathead sole in 2002 (J. Stark, pers. comm.) and included in this assessment for estimation of reference fishing mortality values.

The 2003 survey biomass and length data were added to the model. The catch for 2003 was updated and the length data and catch for 2003 was added to the model. The 2003 survey biomass increased to 258,609 t from 170,915 t in 2001.

ABC for 2004 using  $F_{40\%} = 0.47$  was estimated at 51,721 t. Recent catches have been about 2,000 t, with 2004 catch at 2,360 t (through October 9) (Table 1). The model estimates of age 3+ biomass increased from about 256,600 t in 1984 to about 298,900 t in 1996, decreased to about 287,000 t in 2000, then increased to 291,400 t in 2003.

Projected female spawning biomass was estimated at 82,401 t in 2005, above  $B_{40\%} = 47,696$  t (Tables 2, 3 and 4). 2005 ABC was estimated at 36,247 t fishing at  $F_{40\%}$  (Table 3).

Table 1. Gulf of Alaska flatfish catch (t) through October 9, 2004.

Species	Western	Central	West Yakutat	East Yakutat/SE	Total
Arrowtooth flounder	2,779	12,240	76	33	15,128
Shallow water flatfish	129	2,808	1	0	2,938
Deep water flatfish(Dover sole)	9	614	55	4	682
Flathead sole	820	1,540	0	0	2,360
Rex sole	499	942	0	0	1,441

Table 2. Projected ABC and OFL for 2004 to 2008 by INPFC area for Gulf of Alaska flathead sole.

**Flathead sole ABC by INPFC area**

	Western	Central	West Yakutat	East Yakutat/SE	Total
F=F40%					
2004	13,411	34,433	3,431	447	51,721
2005	9,399	24,131	2,405	313	36,247
2006	7,209	18,510	1,844	240	27,804
2007	6,131	15,740	1,568	204	23,643
2008	5,603	14,387	1,434	187	21,610
F=F35%					
2004	16,789	43,107	4,295	560	64,750
2005	10,602	27,220	2,712	353	40,886
2006	7,653	19,649	1,958	255	29,514
2007	6,387	16,399	1,634	213	24,633
2008	5,834	14,979	1,493	194	22,500

Table 3. Projected female spawning biomass and yield from 2004 to 2008 for Gulf of Alaska flathead sole.

Year	Female spawning biomass(t)	Yield(t)
<b>F=F40%</b>		
2004	109,976	51,721
2005	82,401	36,247
2006	68,613	27,804
2007	61,771	23,643
2008	57,414	21,610
<b>F=F35%</b>		
2004	109,976	64,750
2005	75,280	40,886
2006	59,955	29,514
2007	53,324	24,633
2008	49,449	22,500
<b>F=0.016(avg F)</b>		
2004	109,976	2,085
2005	110,083	2,048
2006	111,733	2,030
2007	113,631	2,038
2008	114,640	2,065
<b>F=0.5 F40%</b>		
2004	109,976	28,310
2005	95,367	23,520
2006	86,878	20,323
2007	81,770	18,426
2008	77,766	17,340
<b>F=0</b>		
2004	109,976	0
2005	111,259	0
2006	113,915	0
2007	116,674	0
2008	118,429	0

Table 4. Summary of results of flathead sole assessment in the Gulf of Alaska.

Natural Mortality	0.2 females and males
Age of full(95%) fishery selection	13 females, 14 males
<b>Reference fishing mortalities</b>	
F40%	0.47
F35%	0.63
Biomass at MSY	N/A
Equilibrium unfished Spawning biomass (B0)	119,240 t
B35% Spawning biomass fishing at F35%	41,734 t
B40% Spawning biomass fishing at F40%	47,696 t

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