Summary of the 2004-2005 Pacific Herring Spawning Season and Commercial Herring Fishery for Tomales Bay

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Director's Herring Advisory Committee
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Tomales Bay 2004-2005 Season Review

In November there were four spawning events totaling 82 tons, which was the fourth highest total for November since the fishery was re-opened in the 1992-93 season. Typically November spawning waves are small and do not hold in the bay long, before spawning, which makes them difficult to sample. We were not able to get good representative population samples from all the spawning waves in November with our multi-panel gill nets. Herring were often schooling in middle of the water column or up near the surface. Rarely were herring holding on the bottom where they could be sampled with our gill nets. We often observed herring in the middle of the bay flipping on the surface. We observed a lot of *Aurelia* (moon jellies) in the bay throughout the season.

Throughout December, herring schools steadily built within the bay. There was a large spawning wave in the bay on the opening day of the season, December 26. Fishing success was hampered by a number of factor; winds were heavy on opening day; the following day, despite fishing upon solid marks, only a hand full of fish per shackle were landed; and there was heavy predation by harbor seals on herring captured in the nets. Additionally, prior to the opening, we observed herring that were "belly caught" rather than gilled in our research samples. This could be a possible effect of El Nino. On December 29, 2004, 24.8 tons of herring were landed, the largest landing of the season. Spawning escapement for December totaled 718 tons, which is below average for the month. This was the first time since the1999-2000 season that spawning escapement in December did not comprise more than 50 percent of the season spawning escapement.

January opened with the same spawning wave within the bay. Herring were not spawning and the fishermen were unable to make landings. On January 6, our Furuno sounder was damaged and we didn't receive it back until the end of the month. During this time, we were unable to provide fishermen with useful observation of the herring school movement within the bay. This also made sampling the population difficult because we were unable to effectively locate herring holding herring. The largest spawning event of the season took place on

January 8-10, when herring that held within the bay for nearly a month spawned. The estimated escapement from this spawn totaled 1,947 tons. Commercial landings were poor and totaled only 3 tons because most of the herring had spawned over the weekend.

The next spawning wave that came in the mid-January was difficult for fishermen to catch. Harbor seals continued to hinder fishermen by overcrowding their nets. On January 27, we were able to sample herring in the act of spawning at beds 28 and 28A. The fish we sampled appeared to be small, and there were very few large herring that would be caught in commercial gear. Only a few small landings were made at the end of the month, and totaled slightly less than 2 tons. The spawning escapement from the last spawning event in January was 757 tons. The combined spawning escapement for the month of January (2,076 tons) was the second highest total for that month since the fishery was re-opened.

We did not locate any schools of herring in the bay for the entire month of February. Spawn escapement estimates did not exceed the 4,000-ton mark, therefore there was no quota increase this season and the quota remained at 400 tons. The commercial season ended on February 25, with no landings in February, and 29.7 tons landed for the season. On February 28, we found spawn at bed 28A that occurred the previous day. As many as 30-50 percent, of the eggs were white and not going to develop properly. We have seen this in similar late season spawns where unfavorable environmental conditions were masked briefly by a rain event. We were unable to get a population sample from this spawning wave. Late season spawning waves are often difficult to sample because they are small schools and do not hold in the bay for very long. The spawn escapement estimate for this spawn was 162 tons.

In October, we used the National Marine Fisheries Service portable remotely operated vehicle (ROV) to observe vegetation in Tomales Bay. The goal of using the ROV was to observe the red algae *Gracilaria sp.* distribution and density in areas of Tomales Bay due to the growing importance of *Gracilaria sp.* as a spawning substrate for herring in Tomales Bay. Distribution and abundance of *Gracilaria sp.* can fluctuate from season to season. Based on observations from recent seasons, *Gracilaria sp.* seems to have become more intermixed with the eelgrass beds in Tomales Bay. The ROV video footage showed that *Gracilaria* had declined in some areas where it was once abundant. The video taken with the ROV showed that *Gracilaria* was widely distributed in some eelgrass beds.

In December, Department divers assisted with our vegetation surveys. The goal of having the diver surveys was to obtain better density estimates of *Gracilaria sp.* based on information obtained from the ROV survey. In addition to sampling the vegetation using quadrats, divers conducted video transects of the areas. Video transects conducted by divers helped to provide more insight on the dynamics of *Gracilaria sp.* distribution within eelgrass beds. As a tool to assess vegetation in Tomales Bay, the diver video transects were better suited than the ROV. Further development of the use of video transects may assist in quantifying *Gracilaria sp.* in the future.

Table 1 Season Spawning Escapement

Spawning Wave	Spawning Date(s)	Spawning Bed Area(s)	Spawning Escapement (tons)
1	11/8/2004	1C	TRACE
2	11/16/2004	28A	6
3	11/20/2004	28, 1A	60
4	11/25/2004	1B	16
5	12/13/2004	1C,1A, Hearts Desire,DC,1,Maffuci, 28, Marconi Cove, 28A,1B	689
6	12/28/04 - 01/10/05	28, 28A, 1A, 29, 2, 1B, Hearts Desire, 1C, Maffuci, 30/Inverness, Millerton, Tony's, 27, 26, Marconi Cove	1,966
7	01/23/05 - 01/29/05	28A, 28, 1B, 1C	757
8	2/27/2005	28A	162
		Total	**3,656**

Table 2 Daily Landings by Tomales Bay Fleet

Date	Pounds	Tons	Tickets	Pound/Ticket	Tons/Ticket	Roe Count
12/29/2004	49665	24.8	20	2483.3	1.2	13.4
1/10/2005	5934	3.0	17	349.1	0.2	10.7
1/24/2005	1982	1.0	6	330.3	0.2	14.7
1/27/2005	296	0.1	2	148.0	0.1	13.0
1/28/2005	1646	0.8	2	823.0	0.4	17.5
Total	59523	29.7	47			
			Average	1266.4	0.6	13.3

Table 3 Season Landings for Tomales Bay

* No commercial landings made

Year	Pounds	Tons	Roe Count
1992-93	444,312	222.3	11.0
1993-94	437,867	218.9	12.3
1994-95	550,262	275.1	12
1995-96	710,573	355.3	13.8
1996-97	443,128	222	11.6
1997-98*	0	0	--
1998-99	104,722	54	15.0
1999-00	83,258	42	15.2
2000-01	596,987	298.5	12.4
2001-02	708,374	354.2	15.4
2002-03	156,351	78	14.0
2003-04	559,320	279.7	12.6
2004-05	59,523	29.7	13.3
Average	**404,556**	**202.5**	**13.2**

Table 4 Season Spawning Biomass for Tomales Bay

* Years of Mesh Study

Season	Spawn Escapement (tons)	Catch (tons)	Percent Catch (Exploitation Rate)	Spawning Biomass
1992-93	3,850	222	5.5%	4,072
1993-94	2,245	219	8.9%	2,464
1994-95	3,705	275	6.9%	3,980
1995-96	1,730	355	17.0%	2,085
1996-97	1,288	222	14.7%	1,510
1997-98	586	0	0.0%	586
1998-99	4,017	54	1.3%	4,071
1999-00	1,968	42	2.1%	2,010
2000-01*	3,897	298	7.1%	4,195
2001-02*	6,889	354	4.9%	7,243
2002-03*	4,304	78	1.8%	4,382
2003-04*	11,844	280	2.3%	12,124
2004-05*	3,656	30	0.8%	3,686
AVERAGE	**3,845**	**187**	**4.6%**	**4,031**
Mesh Study Average	**6,118**	**208**	**3.3%**	**6,326**

Table 5 Historical Lengths of Commercial Gill Net Catch

* No Commercial landings but small sample given to Department staff

Year	Commercial Gill Net Mesh Size	Average Length (mm)
Tomales Bay Gill Net Fishery Re-Opens with 2 1/8-in Mesh		
1992-93	2.125 inches	196.4
1993-94	2.125 inches	197.3
1994-95	2.125 inches	195.5
1995-96	2.125 inches	189.2
1996-97	2.125 inches	194.8
1997-98*	2.125 inches	196
1998-99	2.125 inches	186.3
1999-00	2.125 inches	187.6
Tomales Bay Mesh Study- Mesh Size Reduced to 2.0-in		
2000-01	2.0 inches	188
2001-02	2.0 inches	187.7
2002-03	2.0 inches	188.1
2003-04	2.0 inches	191.1
2004-05	2.0 inches	189.8
Average	**---**	**191.4**