

## APPENDIX A

### *KOHM ADJUSTMENTS FOR 2006 FISHERIES*

The age-4 ocean harvest rate on Klamath River fall Chinook has been significantly under-predicted for three consecutive years. Table A-1 lists the preseason and postseason estimates for these years, stratified by sector (commercial, recreational) and time period (September-December, January-August).

The recreational sector preseason estimates have not been particularly problematic (Table A-1). The commercial sector preseason estimates for the previous September-December period have been somewhat more problematic, but it is not yet clear whether the estimator is positively biased versus generally uncertain (September-December 2002 was over-estimated, Table A-1). The preseason estimates for the September-December period are actually preliminary “postseason” estimates based on coded-wire tag recoveries in these fisheries (these fisheries are prosecuted prior to the preseason planning process) coupled with the current ocean abundance forecasts. These preliminary “postseason” estimates for the September-December period are inputs to the KOHM—not outputs. The primary source for the substantial under-prediction of the age-4 ocean harvest rate in 2003, 2004, and 2005, has been the commercial sector preseason prediction for the January-August period (as highlighted in Table A-1). The preseason predictions for this time period are outputs of the KOHM, and the STT therefore reviewed the KOHM harvest rate predictors for the commercial sector during the January-August period, and adjusted these predictors for the recent observed patterns in the postseason estimates as described below.

The KOHM January-August period age-4 ocean harvest rate predictors are a function of the sector-area-month-specific expected contact rate per unit of effort and the expected level of effort per day open. For the expected contact rate per unit of effort, the KOHM default predictor is a ratio estimator fit to all available data (postseason estimates from 1983–2005). Figure A-1 displays these area-month-specific postseason estimates and contact rate predictors for the commercial sector. The small dots are 1983–2002 postseason values; the large dots are the postseason values of the last three years (2003–2005). The thin predictor line is the ratio estimator fit to the entire dataset (KOHM default); the thick predictor line is the ratio estimator fit to the 2003–2005 data. For the northern Oregon (NO) and central Oregon (CO) areas in March and April, the high contact rates per unit effort in 2003–2005 were initially unanticipated by the KOHM, but the 2006 predictors have now adapted to the recent accumulation of these data and do not appear in need of any adjustment (Figure A-1). During the May-Aug period in the NO and CO areas, there are a few outlying points from the last three years but for the most part the recent data is consistent with the historical data pattern, indicating no adjustment is necessary for these months (Figure A-1). Adjustment of the Oregon KMZ (KO) and California KMZ (KC) predictors is also judged to be unnecessary (Figure A-1). For the Fort Bragg (FB), San Francisco (SF), and Monterey (MO) areas however, there has been a fairly consistent under-prediction of the contact rate per unit of effort across the May-August period (Figure A-1). The consistency of this recent upward shift in the data across this broad geographic area and time period (years, and months within years) argues for restricting the database for these areas to the 2003–2005 period, and this adjustment was made. In summary, for the commercial sector, the 2006 KOHM contact rate per unit of effort predictors for the NO, CO, KO, and KC areas will be the ratio estimator based on all available data (thin line), and for the FB, SF, MO areas will be the ratio estimator based on the 2003–2005 data (thick line).

For the expected level of effort per day open, the KOHM default predictor for the commercial sector is a ratio estimator fit to all available data since 1991 (postseason estimates from 1991–2005). There are two exceptions to this. First, if there is insufficient pre-existing data for a given area in a particular month (e.g., early season fisheries), the effort predictor for the following month in the same area is used (for

early season fisheries this predictor will probably be conservative). Second, in the FB, SF, and MO areas the predictors account for effort shift expected under partial closure of the overall area (effort from the closed areas is assumed to move into the open areas). The FB, SF, and MO effort predictors have worked reasonably well in recent years and do not appear in need of adjustment. The KO and KC effort predictors also appear to be satisfactory. For the NO and CO areas however, there has been relatively high levels of effort in the last few years, and in particular in 2005. While the 2005 NO and CO commercial fisheries were substantially restricted in time and area, the observed levels of effort in those areas and months that were open was unexpectedly high (near record highs in several months), with the result that overall effort across these areas within a month and for the season as a whole was not dampened. In other words, there was considerable effort shift within months, and a concentration of effort across months, in the NO and CO areas in 2005. The effort predictors for the NO and CO areas were thus adjusted in two ways for modeling 2006 fisheries. First, effort shift between these two areas within a month was incorporated into the predictor (as is presently done for the FB, SF, and MO areas): within a particular month, if NO is closed, all of the NO effort is assumed to move into the CO area; and vice-versa. Second, to account for the concentration of effort across months expected under the proposed 2006 options which further restrict opportunity in these areas compared to 2005, the STT concludes that the best available effort predictor for the NO and CO areas in 2006 is the area-month-specific effort per day values observed in 2005. In summary, for the commercial sector, the 2006 KOHM effort per day open predictors for the KO, KC, FB, SF, MO areas will be the ratio estimator based on the 1991–2005 data, and for the NO and CO areas will be the ratio estimator based on the 2005 data. Effort transfer has now been incorporated into the NO and CO area predictors, as it is for the FB, SF, MO area predictors.

To gauge the net effect of these adjustments on the age-4 ocean harvest rate forecast, Table A-2 compares the 2005 preseason prediction versus that which would have resulted had the adjusted KOHM been used for preseason prediction in 2005. In this example, the adjusted KOHM forecasts closely track the January-August postseason results, with the largest unaccounted for errors arising from the September-December preliminary “postseason” estimated values (Table A-2).

Table A-1. 2003-2005 preseason, postseason estimates of Klamath River fall Chinook age-4 ocean harvest rates (percent).

Year (t)	Commercial			Recreational			Combined		
	Sep-Dec(t-1)	Jan-Aug(t)	Sep(t-1)-Aug(t)	Sep-Dec(t-1)	Jan-Aug(t)	Sep(t-1)-Aug(t)	Sep-Dec(t-1)	Jan-Aug(t)	Sep(t-1)-Aug(t)
Pre 2003	3.6	9.9	13.6	0.2	2.3	2.5	3.8	12.2	16.0
Post 2003	2.0	19.8	21.8	0.1	1.2	1.3	2.1	20.9	23.0
Post-Pre 2003	-1.6	9.8	8.2	-0.1	-1.1	-1.2	-1.7	8.7	7.0
Pre 2004	3.4	9.0	12.4	0.5	2.1	2.6	3.9	11.1	15.0
Post 2004	7.5	40.8	48.2	1.0	3.2	4.2	8.5	44.0	52.4
Post-Pre 2004	4.1	31.8	35.9	0.5	1.1	1.6	4.6	32.8	37.4
Pre 2005	2.9	3.0	5.9	0.3	1.4	1.7	3.3	4.4	7.7
Post 2005	8.0	13.6	21.6	0.8	1.6	2.3	8.8	15.2	23.9
Post-Pre 2005	5.1	10.5	15.6	0.4	0.2	0.6	5.5	10.7	16.3

Table A-2. 2005 preseason, adjusted KOHM, and postseason estimates of Klamath River fall Chinook age-4 ocean harvest rates (percent).

Year (t)	Commercial			Recreational			Combined		
	Sep-Dec(t-1)	Jan-Aug(t)	Sep(t-1)-Aug(t)	Sep-Dec(t-1)	Jan-Aug(t)	Sep(t-1)-Aug(t)	Sep-Dec(t-1)	Jan-Aug(t)	Sep(t-1)-Aug(t)
Pre 2005	2.9	3.0	5.9	0.3	1.4	1.7	3.3	4.4	7.7
Post 2005	8.0	13.6	21.6	0.8	1.6	2.3	8.8	15.2	23.9
Post-Pre 2005	5.1	10.5	15.6	0.4	0.2	0.6	5.5	10.7	16.3
KOHM adj 2005	2.9	13.4	16.3	0.3	1.3	1.6	3.3	14.7	18.0
Post 2005	8.0	13.6	21.6	0.8	1.6	2.3	8.8	15.2	23.9
Post-Pre 2005	5.1	0.1	5.2	0.4	0.3	0.7	5.5	0.4	6.0

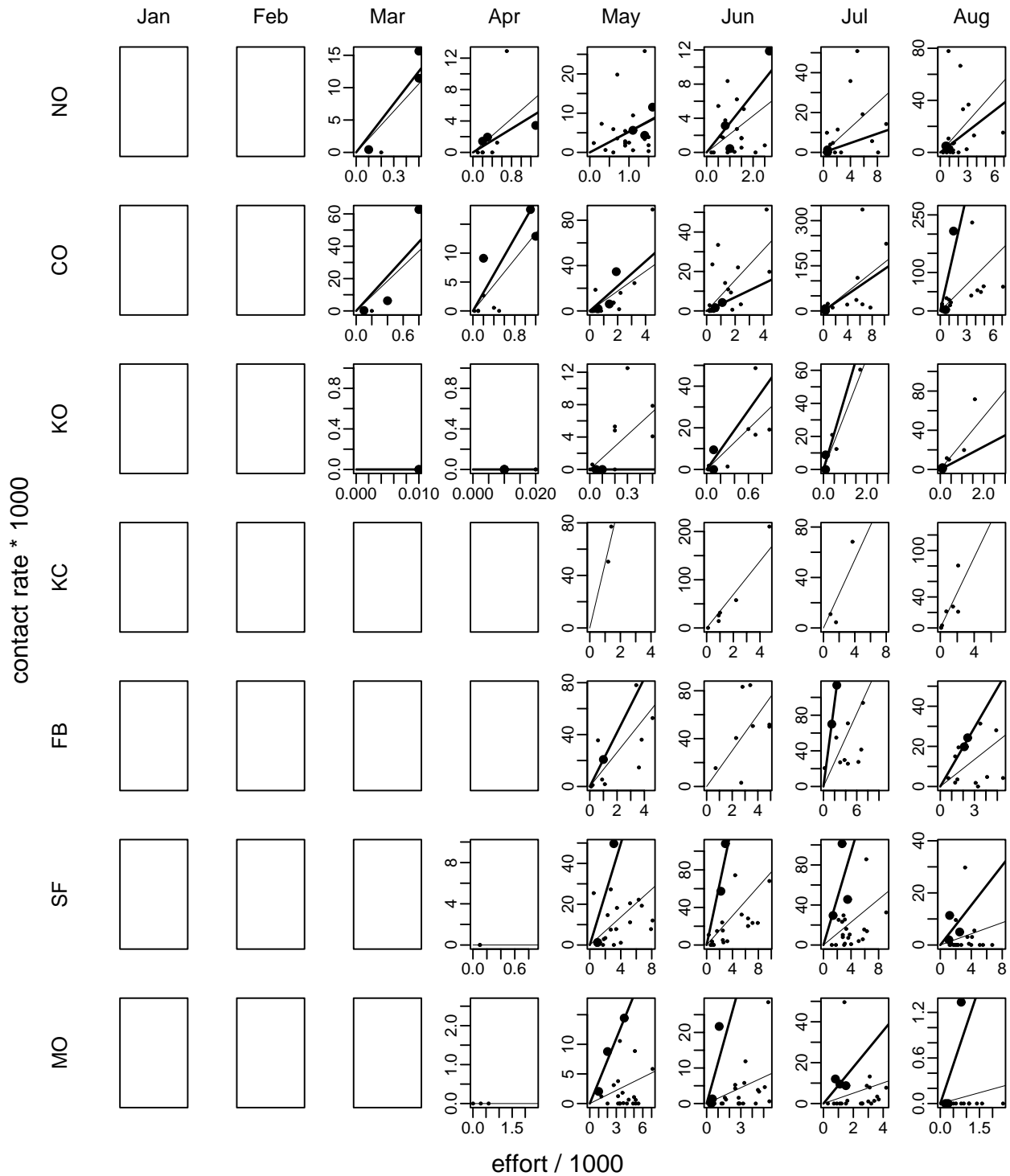


FIGURE A-1. Klamath River fall Chinook commercial age-4 contact rate versus effort for KOHM management areas by month, January through August. Large dots are 2003-2005 postseason values; small dots are 1983-2002 postseason values; thick lines are predictors based on the 2003-2005 data; thin lines are the KOHM default predictors based on all data (1983-2005). See Appendix A text for further details.