Recent updates to Marine Impact Model for IFR Coho

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Recent model updates

- Base period (BP) review
- Incorporation of uncertainty in Average BP exploitation rate (ER)
- Non BP Fisheries
  - Gulf Seine Fishery
  - Split of WCVI Inshore and offshore fisheries
- Troll Target Scalar Update
- Bag limit Scalars

Base Period Review:

- BP estimates of exploitation by strata are averaged over the years
- Review historic data in MRP to determine whether a given fishery was sampled or not (zero vs. null)
- Criteria:
  - If there were recoveries of any Coho in a given strata but no recoveries assigned to IFR Stocks: 0 used assuming the strata was sampled
  - If there was no MRP information for a given strata it was assumed not to have been sampled and a null (or Black) was used
- All BP data has been updated

Uncertainty in Average BP ER:

- Uncertainty in BP ER determined through discrete distributions of the ER data from each year, month and fishery strata
- Excel Add-in Crystal Ball Software (ORACLE) was used to sample the data
- Probability distributions of the IFR Coho impacts can then be generated to look at some of the risk associated with a suite of fishery scenarios

Non BP fisheries:

- BP doesn't cover all fisheries (i.e. Gulf Seine, WCVI Offshore Sport)
- Need alternative method to determine impact of these fisheries
- Updated model to deal with those specific fisheries

Gulf Seine (Non BP fisheries):

- Have sampled Gulf fishery since 2009 for Stock ID (SID) through mSAT DNA and estimated impact
- Average ER/boat day across years sampled to use in model for planned fisheries during similar time periods

Year	Time period	Sample Size	% IFR Coho
2009	September 14-17	83	32.50%
2011	September 7-18	97	32.00%
2013	September 4-19	134	47.50%
Average			37.33%

Gulf Seine Fishery Impact:

Year	Coho Retained	Coho Released	Estimated IFR Coho Mortalities	Total ER	Boat Days	ER/boat day
2009	0	142	12	0.048%	20	0.0024%
2011	292	1865	242	0.918%	138	0.0067%
2013	428	5577	866	1.483%	144	0.0103%
					Average	0.0064%

Used in planning Early-mid September Gulf Seine fisheries

WCVI Sport Fishery Split (Non BP fisheries):

- Since the BP effort distribution has shifted from a primarily inshore fishery to 50-60% of the effort offshore
- That offshore effort no longer coincides with the BP estimates of exploitation
- Need to split the BP impact between Inshore and Offshore and use the WCVI Troll fishery BP data as a surrogate for the offshore sport fishery

WCVI Sport Fishery Split (Non BP fisheries): BP Impact

- CWT based exploitation were reviewed and split based on recoveries inshore vs. offshore areas
- Review of the inshore fishery demonstrated higher impact in May and June relative to July and August (much different than expected based on low effort)

Area	May	Jun	Jul	Aug	Sep	Total
Inside surfline average	0.152%	0.156%	0.000%	0.024%	0.000%	0.33%
Outside surfline average	0.000%	0.067%	0.226%	0.000%	0.108%	0.40%
Total						0.73%

WCVI Sport Fishery Split (Non BP fisheries): Realign Inshore

- Realignment of ER by month by apportioning the total average inshore ER of 0.33% to the various months based average catch proportions over the last 10 years
- Matches a more realistic distribution of fishing effort and likely impact

Area	May	Jun	Jul	Aug	Sep	Total
Inside surfline average (Old)	0.152%	0.156%	0.000%	0.024%	0.000%	0.33%
Inside surfline average (New)	0.000%	0.014%	0.149%	0.167%	0.000%	0.33%
Total						0.73%

WCVI Sport Fishery Split (Non BP fisheries): Offshore

- Use WCVI Troll as surrogate
- Troll BP ERs were scaled based on recent three year average catch in the offshore sport fishery relative to the BP average catch in the troll fishery
- Update BP ERs would align with full bag limit (4 wild/day)
- Bag Scalars would have to be assigned to look at other reduced bag limits and their impacts
- No effort to scale offshore fishery, model will assume similar catch and encounters as the last three years

WCVI Sport Fishery Split (Non BP fisheries): Offshore

Original BP Impact WCVI Sport

Area	May	Jun	Jul	Aug	Sep	Total
Inside surfline average	0.152%	0.156%	0.000%	0.024%	0.000%	0.33%
Outside surfline average	0.000%	0.067%	0.226%	0.000%	0.108%	0.40%
					Total	0.73%

Updated Impact WCVI Sport

Area	May	Jun	Jul	Aug	Sep	Oct	Total
Inside surfline average	0.000%	0.014%	0.149%	0.167%	0.000%	0.000%	0.33%
Outside surfline average	0.000%	0.156%	0.736%	1.659%	0.310%	0.184%	3.045%
						Total	3.375%

Troll Target Scalar:

- Significant modification of troll fisheries have occurred relative to the BP mainly due to shift in targeting of Coho
- Need to modify the fishy scalars to account for this change
- Used BP average catch compositions to assign target scalars

Fishery	Target Scalar
Area H Troll (Johnstone Strait)	80%
Area H Troll (Georgia Strait)	50%
WCVI Troll	40%

Sport Fishery: Bag Limit Scalars

- In order to look at different management options associated with wild retention, bag limit scalars were developed to adjust impact

- Bag limit scalars based on individual angler data derived from the Georgia Strait creel over the BP years.

- Catch during the BP years was adjusted based of different bag limits of 3, 2, 1 wild (4 being the observed catch from the BP years as the bag limits were full) based on angler CPUE

- The proportion of a bag limit was determined relative to the observed catch and that was used to scale the impact

Sport Fishery: Bag Limit Scalars (GSN example)

- A bag limit scalar of 100% means there would be no adjustment to the ER
- Based on the data during the BP, not very many anglers limited out with most getting 2 to 3 Coho
- The model then applies the bag limit scalar to the retained 100% mortality fish and (1-baglimit scalar)*10% for the released component of that catch and then scales the ER and relative effort.

Bag Limit Scalars for GSN (Area 13-16)											
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1 wild	56%	45%	40%	51%	66%	65%	76%	82%	80%	79%	63%	45%
2 wild	78%	72%	66%	75%	85%	84%	92%	95%	95%	95%	82%	70%
3 wild	94%	88%	86%	91%	94%	95%	98%	99%	99%	99%	92%	93%
4 wild	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

$$ER_{tm} = \overline{ER}_{87-97m} \times \mathrm{Re}\,lative\ Effort_{tm/87-97m} \times (BagLimitScalar * 1 + ((1 - BagLimitScalar) * \mathrm{Re}\,lease\ Mortality\ Scalar))$$

Next steps

- Complete documentation of spreadsheet model
- Distribute model and documentation
- Run a variety of fishing scenarios for the 2014 season to evaluate various options