WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

P* Working Group Meeting
September 23-24, 2015
1:00 pm to 5:00 pm
Pelagic Suite Conference Room – Council Office
Teleconference: 1-888-4823560 (Access Code: 5228220)

Participants: Bob Humphreys (NMFS PIFSC), Ariel Jacobs (NMFS – PIRO)
Council staff: Marlowe Sabater (WPRFMC)
On Conference Call / WebEx: Domingo Ochavillo (SSC member, Chair), Todd Miller (SSC member), Frank Camacho (SSC member), Michael Trianni (NMFS-PIFSC), Eric Cruz (NMFS-PIFSC), Trey Dunn (DFW), Mike Tenorio (DFW), Jack Ogumoro (Island Coordinator), Sarah Ellgen (NMFS – PIRO)

DRAFT REPORT

Wednesday, September 23, 2015
Meeting Started: 1:25pm

1. Introductions

Domingo Ochavillo opened the meeting and welcomed the working group participants. The participants made self-introductions. The working group adopted the agenda with some changes where agenda item 4 was skipped because 4.a is not directly related to the P* scoring while 4.b had been part of the review required for the scoring of the different dimensions. There was no need to review the information that will be presented.

Council staff thanked the working group members for the scoring of the different dimensions particularly the productivity and susceptibility dimensions. This is the first P* analysis that utilized a standardized set of criteria for the productivity and susceptibility dimensions based on Patrick et al. 2009. The P* Working Group also consulted with the bottomfish fishermen in the Marianas to score the susceptibility attributes for the 17 species in the complex.

2. Recommendations from previous Council meetings

Council staff presented the recommendations from the 163rd Council meeting. At this meeting, the Council heard a presentation on the 2015 Draft Bottomfish Stock Assessment Updates for American Samoa, Guam, and Commonwealth of Northern Mariana Islands (Yau et al. 2015). The Council recommended the WPSAR peer-review of the assessment update and a special session of the SSC to make a best available science determination. The Council also recommended that staff convene a P* and a SEEM working group to evaluate the scientific and management uncertainties.

Staff presented the events following the 163rd Council meeting where the WPSAR Tier-3-Panel Review was held on August 11-12, 2015 to review the stock assessment updates. The WPSAR panel deemed the updates appropriate for management. The 120th SSC was held on September 16, 2015 and concurred with the WPSAR panel and endorsed the assessment

update as best scientific information available (BSIA) for the bottomfish fisheries in American Samoa, Guam and CNMI. The SSC concurred with the panel, that the data was acceptable for management purposes.

The succeeding meetings will use the SSC-determined BSIA as a basis for the P* analysis.

3. **Overview of the P* process**
Council staff provided an overview of the P* process. The Fishery Ecosystem Plans required the Council to revisit the P* analysis once new information becomes available. The P* process determines the risk level to which the fishery will be managed based on the scientific uncertainties surrounding the stock assessment and the stock it described. There are 4 dimensions in the P* analysis: 1) Assessment Information; 2) Uncertainty Characterization; 3) Stock Status; and 4) Productivity-Susceptibility. Each dimension has criteria scored by working group members. The total scores will be deducted from the 50% risk of overfishing described in Yau et al 2015. The catch that corresponds to the final P* corresponds to the potential Acceptable Biological Catch that the SSC will specify at its 121st Meeting in October 2015.

4. **Discussion of the Scoring of the P* Dimensions and Criteria**
   a. **Assessment information** – The working group discussed the scores under the Assessment Information Dimension.

Quantitative assessment provides estimates of exploitation and B; includes MSY-derived benchmarks; no spatially-explicit information	**AS**	**GU**	**CNMI**
Reliable catch history - whether there is a good estimate of total catch which includes non-commercial/recreational catch	1	0.5	0.5
Standardized CPUE - if the CPUE has been standardized to control for effects other than abundance fluctuations	1	1	1
Species-specific data - whether data for individual species has been incorporated in the model	1	1	1
All sources of mortality accounted for – (whether?) if ALL types of mortality like discards, bycatch, natural, fishing etc. are considered in the model	1	0.5	0.5
Fishery independent survey – whether (an) independent estimate of abundance has been considered in the assessment	1	0.5	0.5
Tagging data – (whether?) movement information, spatial distribution patterns, population estimation from mark-recapture has been considered in the assessment	1	1	1
Spatial analysis - whether area specific information e.g. spatially explicit CPUE information was considered in the assessment	1	1	1
Total Assessment Aspect Score	**7**	**4**	**4**
DIMENSION SCORE EQUIVALENT	**4.0**	**3.6**	**3.6**

Reliable catch history – Guam and CNMI received score(s) on the reliable catch history criterion as 0.5 (partially captured) and were deemed partially reliable. Guam used the creel survey information which had sufficient catch and effort interviews and is one of the fisheries adequately documented by the survey. The CNMI data used was the commercial purchase data which only accounts for the commercial sector of the fishery and not the non-commercial. American Samoa had a bigger reduction score because the data was deemed unreliable because it does not represent total catch and is poor in

capturing the commercial and non-commercial fisheries. It was reported that there were significant landings in Aunuu which is not captured in the creel surveys and also fishing for special events like funerals and weddings.

Standardized CPUE – Since the assessment used nominal CPUE, all three scored (1). No standardizations were performed in this assessment.

Species specific data – the assessment was conducted on a complex of 17 species from various families and depth distribution hence all scored (1)

All sources of mortality accounted for – there (are) no known empirically-based mortality estimates from discards and bycatch. Fishery-based mortality is estimated entirely from the catch and CPUE data hence only a partial score (0.5) was assigned to the Marianas. American Samoa scored (1) because the sources of mortality estimates for American Samoa were deemed virtually non-existent.

Fishery independent data – fishery independent data was used from the 1980's Raioma cruise in the Marianas. The Polovina and Ralston (1986) methods were used by Moffitt and Humphreys (2009) for the MSY estimates which were in turn used to condition the assessment results. These were the Our Living Oceans estimates which were the basis for the fishery independent MSY in the assessment. The Marianas scored this assessment aspect as (0.5) but American Samoa scored it a (1) because the estimates were just derived from the Marianas estimates and extrapolated to habitat size.

Tagging data – there is no large scale tagging data available for the BMUS in American Samoa and Marianas. There is a tagging program implemented by the Pacific Island Fisheries Group in the Marianas but this is only small scale and not incorporated in the assessment update

Spatial analysis – there is no spatial analysis in the actual assessment update although there is some spatial data on the 1980 Raioma cruise and the recent RV OES (2014, 14-04) cruise.

b. Uncertainty characterization

Description	AS	GU	CNMI
Complete. Key determinant – uncertainty in both assessment inputs and environmental conditions included (0)			
High. Key determinant – reflects more than just uncertainty in future recruitment (2.5)			
Medium. Uncertainties are addressed via statistical techniques and sensitivities, but full uncertainty is not carried forward in projections (5)	5	5	5
Low. Distributions of Fmsy and MSY are lacking (7.5)			
None. Only single point estimates; no sensitivities or uncertainty evaluations (10)			
DIMENSION SCORE	**5**	**5**	**5**

The uncertainty characterization did not change between 2012 and 2015 since this was a simple update to the Brodziak et al. 2012 assessment update with 3 years of additional data. All areas had a score of (5) points leading to a 5 point reduction since uncertainties were not carried forward in the project. It utilized nominal CPUE and no standardizations were applied.

c. Stock status

Stock Status Description	Biomass level & Fishing level	AS	GU	CNMI
Neither overfished nor overfishing (0).	Stock > MSST & BMSY, F < MFMT	0	0	0
Neither overfished nor overfishing (2).	Stock > MSST, F < MFMT			
Neither overfished nor overfishing (4).	Stock ≥ MSST, F ≤ MFMT			
Stock is not overfished, overfishing is occurring (6)	Stock > MSST, F > MFMT			
Stock is overfished, overfishing is not occurring (8)	Stock < MSST, F ≤ MFMT			
Stock is overfished, overfishing is occurring (10)	Stock < MSST, F > MFMT			
	DIMENSION SCORE	**0**	**0**	**0**

The stock status did not change between 2012 and 2015. The stock remains not overfished and is not experiencing overfishing. The reference points actually increased slightly with the addition of 3 additional years of data. All three areas scored a (0) point reduction.

d. Productivity and susceptibility – the 2015 P* Analysis utilized a standardized criteria for evaluating the productivity and susceptibility of the different species in the BMUS complex. The productivity and susceptibility attributes were adopted from Patrick et al. 2009.

Species (common name)	Component	Average PS Score		
		AS	GU	CNMI
Caranx lugubris (black trevally)	Deep	4.2	5.7	4.9
Aphareus rutilans (lehi)	Deep	4.3	5.8	5.4
Etelis carbunculus (ehu)	Deep	4.9	6.0	6.3
Etelis coruscans (onaga)	Deep	5.1	6.7	6.1
Pristipomoides auricilla (yellowtail snapper)	Deep	3.9	5.5	5.2
Pristipomoides filamentosus (opakapaka)	Deep	4.3	6.1	5.9
Pristipomoides flavipinnis (yelloweye opakapaka)	Deep	4.1	5.6	5.4
Pristipomoides seiboldi (kalekale)	Deep	3.0	5.3	5.5
Pristipomoides zonatus (gindai)	Deep	3.9	5.8	5.6
Aprion virescens (uku)	Shallow/Deep	4.5	5.7	5.3
Caranx ignobilis (giant trevally)	Shallow	4.8	5.8	5.7
Epinephelus fasciatus (black tip grouper)	Shallow	3.7	4.8	5.2
Lethrinus amboinensis (ambon emperor)	Shallow	3.4	5.2	5.0
Lethrinus rubrioperculatus (red gill emperor)	Shallow	4.0	5.2	3.6
Lutjanus kasmira (blue lined snapper)	Shallow	2.6	5.0	4.5

Variola louti (lunar tail grouper)	Shallow	4.4	5.3	5.0
Seriola dumerilii (amberjack)	Shallow/Deep	3.7	6.2	4.8
	DIMENSION SCORE	**4.1**	**5.6**	**5.3**

Expert panel members from the Life History Program of PIFSC (Bob Humphreys, Brett Taylor, and Michael Trianni) provided the productivity scores while bottomfish fishermen were requested to score the susceptibility attributes (Anthony Flores, Jack Villagomez and James Borja).

The working group did not go over the individual scores for each productivity/susceptibility attribute to species combination. The group discussed similarities in the scoring and the rationale behind the scores:

- Rate of population increase – currently the Western Pacific has no information on this attribute hence scored as (5) across all species;
- Estimated total mortality – currently no estimate, scored (5) across the all species;
- Fecundity – all species bear millions of eggs released in the water column hence scored (0) across all species
- Breeding patterns – the species in the complex are all broadcast spawners hence a score of (0);
- Recruitment pattern – currently unknown hence a score of (5);
- Maximum age – utilized information on the Hawaii and Guam samples from the bomb radiocarbon work;
- Maximum size – utilized BioSampling Program data;
- VBGF – score (5) as moderate but some species are unknown which also received a score of (5);
- Mean trophic level – was interpreted as high productivity if planktonic feeder; moderate if an omnivore; and low productivity if a piscivore

Other jurisdictions had similar thinking regarding the scores. The raw scoring of each of the productivity and susceptibility attributes per species can be found in Appendix 1.1 and 1.2.

5. **Public comment** – There was no public comment

6. **Summary of scores and P* recommendations –** Below are the final point reduction for the Territory Bottomfish P* Analysis. The P* Working Group recommended a reduction of risk of overfishing level to 36% for Guam and CNMI and 37% for American Samoa.

P* DIMENSIONS	**Am. Samoa**	**Guam**	**CNMI**
Dimension 1: Assessment information	4	3.6	3.6
Dimension 2: Uncertainty characterization	5	5	5
Dimension 3: Stock status	0	0	0
Dimension 4: Productivity-Susceptibility	4.1	5.6	5.3
Total risk reduction score	*13.1*	*14.2*	*13.9*
Risk of overfishing level (P*)	**37**	**36**	**36**

The Working Group also recommended some improvements to the P* Analysis:

- Consider applying a weighting factor for some of the productivity and susceptibility attributes because some may be more important than others or may have more information than others

- Need to further refine the default scoring of (5) to differentiate the actual score of (5) with information versus a (5) if no information. A member recommended (5*) if there is no information compared to (5) for a moderate productivity attribute

- Some technical corrections were brought up – (1) *Aphareus furca* should be *Aphareus rutilans*; (2) *Seriola dumerilii* and *Aprion virescens* should be both a shallow and deep component while *Variola louti* should be a shallow component not deep

The meeting adjourned at 3:15 PM.

REFERENCES

Brodziak, J., J. O'Malley, B. Richards, and G. DiNardo. 2012. Stock assessment update of the status of the bottomfish resources of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam, 2012. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-12-04, 124 p.

Moffitt, R., and R. Humphreys. 2009. Unit 17 - Western Pacific Bottomfish and Groundfish Fisheries. p. 231-236 in DOC, NOAA, NMFS Our Living Oceans – Report on the Status of U.S. Living Marine Resources, 6th edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFSF/SPO-80, 369 p.

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Polovina, J., and Ralston, S. 1986. An approach to yield assessment for unexploited resources with application to the deep slope fishes of the Marianas. Fishery Bulletin, 84(4): 759-770.

Yau. A., M. Nadon, B. Richards, J. Brodziak, and E. Fletcher. 2015. Stock Assessment Updates of the Bottomfish Management Unit Species of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam in 2015 Using Data through 2013. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Pacific Islands Fish. Sci. Cent. NOAA Tech. Memo. xxxx

Appendix 1.1. Productivity-attribute scores for the 17 Bottomfish Management Unit Species in American Samoa, Guam and CNMI

AMERICAN SAMOA - RLH

Productivity attributes	High (0)	Moderate (5)	Low (10)	*C. lugubris*	*A.rutilans*	*E. carbunculus*	*E. coruscans*	*P auricilla*	*P. filamentosus*	*P. flavipinnis*	*P. seiboldi*	*P. zonatus*	*A. virescens*	*C. ignobilis*	*E. fasciatus*	*L. amboinensis*	*L. rubriopercula tus*	*L. kasmira*	*V. louti*	*S. dumerilii*
Rate of population increase - r	>0.5	0.16-0.5	<0.16	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Maximum age	<10 yrs	10-30 yrs	>30 yrs	0	5	10	10	5	10	5	5	10	5	5	5	5	5	0	5	5
Maximum size	<60cm	60-150cm	>150cm	5	5	5	5	0	5	5	0	0	5	5	0	0	0	0	5	5
von Bertalanffy growth coefficient (k)	>0.25	0.15-0.25	<0.15	5	5	5	10	5	5	5	5	5	5	10	10	5	5	0	5	0
Estimated natural mortality	>0.40	0.20-0.40	<0.2	5	5	5	5	5	5	5	0	5	5	5	5	5	5	0	5	5
Measured fecundity	>10e4	10e2-10e3	<10e2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Breeding strategy	0	between 1 and 3	≥4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recruitment pattern	high recruitment success	moderate recruitment success	infrequent recruitment success	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Age at maturity	<2 yrs	2-4 yrs	>4 yrs	5	5	5	10	5	5	5	5	5	5	5	5	5	5	0	5	5
Mean trophic level	<2.5	between 2.5 and 3.5	>3.5	10	5	10	5	5	5	5	5	5	10	10	10	5	5	5	10	10
			Ave Prod score for spp.	**4**	**4**	**5**	**5.5**	**3.5**	**4.5**	**4**	**3**	**4**	**4.5**	**5**	**4.5**	**3.5**	**3.5**	**1.5**	**4.5**	**4**

GUAM - BMT

Productivity attributes	High (0)	Moderate (5)	Low (10)	*C. lugubris*	*A. furca*	*E. carbunculus*	*E. coruscans*	*P auricilla*	*P. filamentosus*	*P. flavipinnis*	*P. seiboldi*	*P. zonatus*	*A. virescens*	*C. ignobilis*	*E. fasciatus*	*L. amboinensis*	*L. rubriopercularus*	*L. kasmira*	*V. louti*	*S. dumerilii*
Rate of population increase - r	>0.5	0.16-0.5	<0.16	8	5	7.5	10	5	5	5	5	5	5	5	2.5	5	5	5	5	5
Maximum age	<10 yrs	10-30 yrs	>30 yrs	5	5	5	10	7.5	10	7.5	5	7.5	5	5	5	5	5	5	5	5
Maximum size	<60cm	60-150cm	>150cm	5	5	2.5	5	0	5	2.5	0	2.5	5	7.5	0	2.5	2.5	0	2.5	5
von Bertalanffy growth coefficient (k)	>0.25	0.15-0.25	<0.15	3	2.5	5	5	0	2.5	2.5	2.5	2.5	2.5	2.5	0	0	0	0	0	10
Estimated natural mortality	>0.40	0.20-0.40	<0.2	5	10	10	10	10	10	7.5	7.5	10	10	7.5	5	5	5	2.5	5	5
Measured fecundity	>10e4	10e2-10e3	<10e2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Breeding strategy	0	between 1 and 3	≥4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Recruitment pattern	high recruitment success	moderate recruitment success	infrequent recruitment success	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Age at maturity	<2 yrs	2-4 yrs	>4 yrs	5	5	5	10	5	5	5	5	5	2.5	5	2.5	5	5	5	5	10
Mean trophic level	<2.5	between 2.5 and 3.5	>3.5	10	10	10	10	7.5	10	7.5	7.5	10	10	10	7.5	7.5	7.5	7.5	10	10
			Ave Prod score for spp.	**5.5**	**5.8**	**6.0**	**7.5**	**5.0**	**6.3**	**5.3**	**4.8**	**5.8**	**5.5**	**5.8**	**3.8**	**4.5**	**4.5**	**4.0**	**4.8**	**6.5**

CNMI - MT

Productivity attributes	High (0)	Moderate (5)	Low (10)	*C. lugubris*	*A. furca*	*E. carbunculus*	*E. coruscans*	*P auricilla*	*P. filamentosus*	*P. flavipinnis*	*P. seiboldi*	*P. zonatus*	*A. virescens*	*C. ignobilis*	*E. fasciatus*	*L. amboinensis*	*L. rubrioperculatus*	*L. kasmira*	*V. louti*	*S. dumerilii*
Rate of population increase - r	>0.5	0.16-0.5	<0.16	5	10	10	5	5	5	5	5	5	10	10	5	5	2.5	2.5	5	5
Maximum age	<10 yrs	10-30 yrs	>30 yrs	5	0	5	5	5	5	5	5	5	5	10	5	5	0	0	5	5
Maximum size	<60cm	60-150cm	>150cm	5	5	5	5	0	5	0	5	0	5	10	0	5	0	0	5	5
von Bertalanffy growth coefficient (k)	>0.25	0.15-0.25	<0.15	5	0	5	5	0	5	5	5	5	5	10	0	5	0	0	5	5
Estimated natural mortality	>0.40	0.20-0.40	<0.2	5	0	5	5	5	10	5	5	5	5	10	5	5	0	0	5	5
Measured fecundity	>10e4	10e2-10e3	<10e2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Breeding strategy	0	between 1 and 3	≥4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Recruitment pattern	high recruitment success	moderate recruitment success	infrequent recruitment success	5	5	5	5	5	5	5	5	5	5	5	5	5	0	5	5	5
Age at maturity	<2 yrs	2-4 yrs	>4 yrs	10	5	5	10	5	5	5	5	5	5	10	10	5	0	5	5	5
Mean trophic level	<2.5	between 2.5 and 3.5	>3.5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			Ave Prod score for spp.	**6**	**4.5**	**6**	**6**	**4.5**	**6**	**5**	**5.5**	**5**	**6**	**8.5**	**5**	**5.5**	**2.3**	**3.3**	**5.5**	**5.5**

Appendix 1.2. Susceptibility-attribute scores for the 17 Bottomfish Management Unit Species in American Samoa, Guam and CNMI

AMERICAN SAMOA - DO

Susceptibility attributes	Low (0)	Moderate (5)	High (10)	*C. lugubris*	*A. furca*	*E. carbunculus*	*E. coruscans*	*P auricilla*	*P. filamentosus*	*P. flavipinnis*	*P. seiboldi*	*P. zonatus*	*A. virescens*	*C. ignobilis*	*E. fasciatus*	*L. amboinensis*	*L. rubrioperculatus*	*L. kasmira*	*V. louti*	*S. dumerilii*
Areal overlap	<25%of stock occurs in the area fished	25%-50% of the stock occurs in the area fished	>50% of the stock occurs in the area fished	10	10	10	10	10	10	10	5	5	10	10	5	5	10	10	10	5
Geographic concentration	stock distributed in > 50% of its range	stock distributed in 25-50% of its range	stock distributed in <25% of its range	0	0	0	0	0	0	0	5	5	0	0	5	5	0	0	0	5
Vertical overlap	<25%of stock occurs in the depths fished	25%-50% of the stock occurs in the depths fished	>50% of the stock occurs in the depths fished	10	10	10	10	10	10	10	5	5	10	10	5	5	10	10	10	5
Seasonal migrations	Seasonal migrations decrease overlap w/ the fishery	Seasonal migrations do not substantially affect the overlap w/ the fishery	Seasonal migrations increase overlap with the fishery	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Schooling/aggregation	Behavioral responses decrease the catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear	5	5	5	5	5	5	5	5	5	5	5	5	5	7.5	0	5	5
Morphology affecting capture	Species shows low selectivity to the fishing gear	Species shows moderate selectivity to the fishing gear	Species shows high selectivity to the fishing gear	5	7.5	7.5	7.5	7.5	5	5	0	5	7.5	7.5	0	5	7.5	10	5	5
Desirability/value of the fishery	Stock is not highly valued or desired by the fishery	Stock is moderately valued or desired by the fishery	Stock is highly valued or desired by the fishery	7.5	7.5	10	10	5	5	5	0	5	7.5	7.5	0	0	5	0	7.5	5
Management strategies or current regulations on the species	Targeted stocks have catch limits and other local management regs; regs fully enforced	Targeted stock have catch limits and other local management regs but no strong enforcement	No regulations both at federal and local side hence no enforcement needed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Fishing rate relative to M	<0.5	0.5-1.0	>1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biomass of spawners (SSB) or other proxies	B is 40% of B0 (or max observed from time series of biomass estimates	B is between 25%-40% of B0 (or maximum observed from time series of biomass estimates	B is <25% of B0 (or maximum observed from time series of biomass estimates)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0
Survival after capture and release	Probability of survival >67%	Probability of survival between 33-37%	Probability of survival <33%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery impact to EFH or habitat in general	Adverse effecs absent, minimal or temporary	Adverse effects more than minimal or temporary but are mitigated	Adverse effect more than minimal or temporary and are not mitigated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			AVERAGE	4.4	4.6	4.8	4.8	4.4	4.2	4.2	2.9	3.8	4.6	4.6	2.9	3.3	4.6	3.8	4.4	3.3

GUAM - JB

Susceptibility attributes	Low (0)	Moderate (5)	High (10)	*C. lugubris*	*A. furca*	*E. carbunculus*	*E. coruscans*	*P auricilla*	*P. filamentosus*	*P. flavipinnis*	*P. seiboldi*	*P. zonatus*	*A. virescens*	*C. ignobilis*	*E. fasciatus*	*L. amboinensis*	*L. rubrioperculatus*	*L. kasmira*	*V. louti*	*S. dumerilii*
Areal overlap	<25%of stock occurs in the area fished	25%-50% of the stock occurs in the area fished	>50% of the stock occurs in the area fished	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Geographic concentration	stock distributed in > 50% of its range	stock distributed in 25-50% of its range	stock distributed in <25% of its range	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Vertical overlap	<25%of stock occurs in the depths fished	25%-50% of the stock occurs in the depths fished	>50% of the stock occurs in the depths fished	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Seasonal migrations	Seasonal migrations decrease overlap w/ the fishery	Seasonal migrations do not substantially affect the overlap w/ the fishery	Seasonal migrations increase overlap with the fishery	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Schooling/aggregation	Behavioral responses decrease the catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Morphology affecting capture	Species shows low selectivity to the fishing gear	Species shows moderate selectivity to the fishing gear	Species shows high selectivity to the fishing gear	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Desirability/value of the fishery	Stock is not highly valued or desired by the fishery	Stock is moderately valued or desired by the fishery	Stock is highly valued or desired by the fishery	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Management strategies or current regulations on the species	Targeted stocks have catch limits and other local management regs; regs fully enforced	Targeted stock have catch limits and other local management regs but no strong enforcement	No regulations both at federal and local side hence no enforcement needed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fishing rate relative to M	<0.5	0.5-1.0	>1																	
Biomass of spawners (SSB) or other proxies	B is 40% of B0 (or max observed from time series of biomass estimates	B is between 25%-40% of B0 (or maximum observed from time series of biomass estimates	B is <25% of B0 (or maximum observed from time series of biomass estimates)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Survival after capture and release	Probability of survival >67%	Probability of survival between 33-37%	Probability of survival <33%	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Fishery impact to EFH or habitat in general	Adverse effecs absent, minimal or temporary	Adverse effects more than minimal or temporary but are mitigated	Adverse effect more than minimal or temporary and are not mitigated	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			AVERAGE	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**

CNMI - JV&AF

Susceptibility attributes	Low (0)	Moderate (5)	High (10)	*C. lugubris*	*A. furca*	*E. carbunculus*	*E. coruscans*	*P auricilla*	*P. filamentosus*	*P. flavipinnis*	*P. seiboldi*	*P. zonatus*	*A. virescens*	*C. ignobilis*	*E. fasciatus*	*L. amboinensis*	*L. rubrioperculatus*	*L. kasmira*	*V. louti*	*S. dumerilii*
Areal overlap	<25%of stock occurs in the area fished	25%-50% of the stock occurs in the area fished	>50% of the stock occurs in the area fished	0	10	10	10	10	5	10	5	10	10	5	10	5	0	10	10	10
Geographic concentration	stock distributed in > 50% of its range	stock distributed in 25-50% of its range	stock distributed in <25% of its range	0	0	0	0	0	5	0	5	0	0	5	0	5	5	0	0	0
Vertical overlap	<25%of stock occurs in the depths fished	25%-50% of the stock occurs in the depths fished	>50% of the stock occurs in the depths fished	0	5	10	10	5	5	5	5	10	5	0	5	5	10	10	5	5
Seasonal migrations	Seasonal migrations decrease overlap w/ the fishery	Seasonal migrations do not substantially affect the overlap w/ the fishery	Seasonal migrations increase overlap with the fishery	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Schooling/aggregation	Behavioral responses decrease the catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear	10	10	10	10	10	10	10	10	10	5	0	5	5	10	10	5	5
Morphology affecting capture	Species shows low selectivity to the fishing gear	Species shows moderate selectivity to the fishing gear	Species shows high selectivity to the fishing gear	5	10	10	5	5	5	5	5	5	10	5	5	5	5	5	5	5
Desirability/value of the fishery	Stock is not highly valued or desired by the fishery	Stock is moderately valued or desired by the fishery	Stock is highly valued or desired by the fishery	10	10	10	10	10	10	10	5	10	5	0	10	10	10	5	0	5
Management strategies or current regulations on the species	Targeted stocks have catch limits and other local management regs; regs fully enforced	Targeted stock have catch limits and other local management regs but no strong enforcement	No regulations both at federal and local side hence no enforcement needed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fishing rate relative to M	<0.5	0.5-1.0	>1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biomass of spawners (SSB) or other proxies	B is 40% of B0 (or max observed from time series of biomass estimates	B is between 25%-40% of B0 (or maximum observed from time series of biomass estimates	B is <25% of B0 (or maximum observed from time series of biomass estimates)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Survival after capture and release	Probability of survival >67%	Probability of survival between 33-37%	Probability of survival <33%	0	10	10	10	10	10	10	10	10	0	0	10	0	0	10	10	0
Fishery impact to EFH or habitat in general	Adverse effecs absent, minimal or temporary	Adverse effects more than minimal or temporary but are mitigated	Adverse effect more than minimal or temporary and are not mitigated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			AVERAGE	**3.8**	**6.3**	**6.7**	**6.3**	**5.8**	**5.8**	**5.8**	**5.4**	**6.3**	**4.6**	**2.9**	**5.4**	**4.6**	**5.0**	**5.8**	**4.6**	**4.2**