HABITAT COMMITTEE REPORT ON CURRENT HABITAT ISSUES

Offshore Wind Energy

Habitat Committee (HC) members Glen Spain and Steve Scheiblauer attended a recent webinar on wind energy hosted by Responsible Offshore Development Alliance (RODA). The webinar focused on East Coast shallow-water issues. A "scientific synthesis document" summarizing the state of the science on potential wind-ocean ecosystem impacts will be released as a follow-up from this meeting. The Pacific Coast Federation of Fishermen's Associations has asked RODA to do a similar West Coast-focused webinar in the near future.

In September, the Council was asked to consider creating an *ad hoc* committee to advise the Council on offshore wind, aquaculture, and similar proposals. The HC supports the proposal and recommends that any such committee consider the habitat implications of these proposals as well as their impacts on the fishing industry.

Aquaculture opportunity areas

NOAA is soliciting comments on Aquaculture Opportunity Areas (AOAs) as part of the May 7 Executive Order (EO) on Promoting American Seafood Competitiveness and Economic Growth.

The EO directs the Secretary of Commerce to establish ten AOAs nationwide by 2025. The first two proposed AOAs are in the Southern California Bight and the Gulf of Mexico. NOAA plans to identify three to five sub-areas within each AOA for future aquaculture siting. After the first two AOAs are identified in the first year, the EO directs that two additional AOAs be identified in each of the following four years until there are a total of ten AOAs.

The HC discussed the importance of developing a comment letter that would evaluate the proposed AOA in Southern California and provide information about areas along the West Coast that should be avoided for proposed AOAs. Considerations include valuable fishing grounds, habitat areas of particular concern, Essential Fish Habitat (EFH) Conservation Areas, and areas prone to hypoxia and harmful algal blooms.

The Council comments to the Corps on its proposed nationwide permits for mariculture are consistent with the input solicited for the AOA. The HC recommends the Council provide a comment letter on NOAA's public notice through the quick response process. The public comment deadline is December 22 (see notice in 85 *Federal Register* 67519 (Oct. 23, 2020)).

Salmon Rebuilding Plans

The HC has been asked by the Council to examine habitat issues that contributed to the overfishing status for Sacramento fall Chinook and Klamath River fall Chinook. The intent is to address whether specific habitat-related issues might be driving poor returns in years assessed in the rebuilding plan, examine cumulative effects, address whether poor habitat conditions might persist in more recent years, and provide direction for Council engagement.

In response, the HC has developed a list of life-stage-specific habitat indicators for Sacramento River fall Chinook along with predictions regarding the relationship between the indicator and life stage survival. After initial review, the list comprises 28 indicators addressing six life stages: spawners contributing to cohort, egg-fry survival, freshwater/delta rearing, hatchery releases, marine survival, and adult return migrations. Indicators for the Sacramento are in draft form but are reasonably complete, with data available from the 1980s to the present.

Indicators are included on Attachment 1 to this report. The draft stoplight chart is in Attachment 2.

The next steps for the HC include finalizing indicators for Sacramento River fall Chinook and aggregating indicator data for Klamath River fall Chinook. The working group will reach out to interested parties to discuss and review the indicators and prepare a completion report. The analysis could be included in the draft Ecosystem Indicators Report to be presented to the Council in March.

Beaver ESA/EFH consultations

Chuck Wheeler and Jody Walters of National Marine Fisheries Service (NMFS) briefed the HC on recent NMFS EFH and Endangered Species Act consultations with the Department of Agriculture's Wildlife Services on the control of semiaquatic mammals in Washington and Oregon. The consultations were the result of a lawsuit and include beaver and other aquatic mammals. The consultation recognizes the considerable benefit of maintaining beavers to improve salmonid habitat.

NMFS stated that significant progress was made through the consultation to improve understanding of the importance of beavers in maintaining salmon habitat, document the scope of historic lethal beaver removals, and understand how to better document and minimize lethal removals. Lethal removal of beaver under the new consultation programs in Washington State is declining; beaver removals in Oregon are currently paused pending a National Environmental Policy Act analysis. The HC appreciates and encourages these efforts, given the importance of beavers in enhancing salmonid habitat. We'd also like to point to a new brochure promoting non-lethal beaver management techniques for landowners and resource managers.

Court Invalidates FDA Approval of AquaBounty GMO Salmon

A court recently ruled that Food and Drug Administration's (FDA) approval of AquaBounty's genetically modified (GMO) salmon for use in aquaculture was invalid. The AquaBounty application for use of a GMO organism in aquaculture was the first of its kind. The FDA's approval of the application was challenged in court by the Institute for Fisheries Resources.

The court ruled that the approval was invalid because the FDA did not "meaningfully analyze what might happen to normal salmon in the event the engineered fish did survive and establish themselves in the wild." In short, the FDA must now consider both the short-term and long-term environmental impacts of the potential release of GMO organisms into the wild, under both the National Environmental Policy Act and the Endangered Species Act. The court remanded the issues back to the FDA, ordering it to redo its impacts analysis accordingly. However, the court has not cancelled the current FDA permit, so GMO salmon eggs may still be marketed (with

restrictions to prevent escapes) while the FDA redoes its impacts analysis. The ruling can be found online here.

Columbia River Biological Opinion

The Biological Opinion for the Columbia River Systems Review was signed on July 24, 2020, and the Record of Decision was adopted in September 2020. The Biological Opinion is currently in litigation in a continuation of the case that has been proceeding for more than a decade. The case is expected to be heard in mid-2021. The present case is titled National Wildlife Federation, et al. vs. National Marine Fisheries Service, et al., U.S. Dist. Court of Oregon (Northern District), Case No. 01-640-SI.

Recommended Council Actions

1. The HC recommends the Council provide comments in response to NOAA's public notice on Aquaculture Opportunity Areas. The public comment deadline is December 22, so this would need to be done through the quick response process.

PFMC
11/12/20

Attachment 1. Draft list of indicators by life stage, including description, abbreviation (see Attachment 2), and predicted directional relationship with adult productivity. Indicators may be added or removed based on further analysis and discussions with experts.

Life stage	Description	Indicator	Abbreviation	Predicted relationship with productivity
Adult spawners	Spawning escapement contributing to BY	Fall run spawners*	Spawners	Positive
	Migration barriers from low flow	Fall low flows	F.flow	Positive
	Pre-spawn mortality from temperature/low flow	Fall temperatures in mainstem	F.temp	Negative
Egg-fry survival	Redd dewatering	Fall-winter low flows in tributaries (7-day 10%ile flow)	F.7Q10	Positive
	Temperature impacts to eggs/migrant fry	egg-fry temperatures* (Oct-Nov)	I.temp	Negative
	Egg-fry survival	Egg-fry survival	FW.surv	Positive
FW/delta rearing	Low flows (poor connectivity)	Fall-spring flows*	W.flow	Positive
	Low flows (poor connectivity)	Delta outflow index (Mar-May)	S. delta.out	Positive
	Low flows (poor connectivity)	7-day flow range	Flow.range	Negative
	Low flows (poor water quality)	Total annual precipitation	Ann.precip	Positive
	High temperatures	Fall-spring temperatures	S.air.temp	Negative
	Barriers/impacts to rearing	% of time in fall delta cross channel is engaged in spring	S.delta.c.chan	Negative
	Barriers/impacts to rearing	Days Yolo bypass was accessible (April-June?)	Yolo.days	Positive
	Other water quality problems	Delta water quality indicators? (DO? Others?)	Water.qual	Positive
Hatchery releases	Low hatchery releases	Release size	Hatch.releases	Positive
	Non-natal releases	Prop net pen releases	Prop.net.pen	Positive/negative[1]
	Release timing relative to ocean phenology	avg release day away from spring transition	Day.release-trans	Negative
	Release timing relative to FW pulses	avg release day away from spring flow pulses	Day.release-FW	Negative
Marine rearing	Large-scale marine climate	SST arc, other IEA physical indicators?	SSTarc	Negative
	Large-scale marine climate	North Pacific high (annual)	NPH	Negative
	Large-scale marine climate	North Pacific Gyre Oscillation (annual)	NPGO	Positive
	Feeding conditions	IEA forage indicators	Forage	Positive
	Marine predation	Marine predation index*	Marine.pred	Negative
	Marine survival	Marine survival index	Marine.surv	Positive
Adult return	Marine harvest	Commercial & marine recreational fishing harvest rates	marine.harv	Positive
	In-river harvest rate	In-river recreational harvest rate	Inriver.harv	Positive
	Adult straying	Stray rate estimates	Stray.rate	Negative
	Straying b/c of Delta cross channel	% of time in fall delta cross channel is engaged in fall	F.delta.c.chan	Positive
	Pre-spawn mortality from temperature/low flow	Delta/mainstem/tributatry temperatures in return year	F.temp.ad	Negative

* Indicators used in SWFSC life cycle-based statistical model

[1]Indicator may have poor directionality

Attachment 2. Draft stoplight table of habitat indicators. Each row represents a brood year (orange = years related to rebuilding plan), column represents a habitat indicator (see attachment 1) at one of six life stages (adults contributing to cohort, egg-fry survival, freshwater and delta rearing, hatchery releases, Marine residence, and adult returns). Annual data for each indicator is ranked from the best year in the data set, 1 with the median being 0.5. The scored values in each cell are presented in the stoplight chart, where the upper 33% of ranks are coded green, the middle 33% coded yellow and the bottom 33% coded red. NA = missing data. Blank gray = indicators awaiting data analysis. Further evaluations of the indicators will include identifying factors that were particularly poor during the overfishing brood years 2012-2014, and evaluating if some indicators generally had greater ability to predict adult productivity. Indicators may be added or removed based on further analysis and discussions with experts.

Brood Year	Adults contributing to BY			Egg-fry survival			FW/delta rearing								Hatchery releases				Marine rearing					Adult returns - lagged 3 years to match brood year					
	Spawners	F.flow	F.temp	F.7Q10	I.temp	FW.surv	W.flow	S. delta.out	Flow.range	Ann.precip	S.air.temp	S.delta.c.chan	Yolo.days	Water.qual	Hatch.releases	Prop.net.pen	Day.release-trans	Day.release-FW	SSTarc	NPH	NPGO	Forage	Marine.pred	Marine.surv	Marine.harv	Inriver.harv	Stray.rate	F.delta.c.c	F.temp.ad	
1983	0.297	0.973	0.806	0.947			1.000	0.527	0.395	1.000	0.919	NA	0.973		0.457	0.943			0.406	0.394	0.054		0.412		0.794	0.588		0.709		
1984	0.378	1.000	0.445	1.000			0.684	0.138	0.079	0.648	0.622	NA	0.763		0.028	0.572			0.433	0.736	0.891		0.648		0.911	0.558		0.612		
1985	0.594	0.894	NA	0.894			0.368	0.833	0.737	0.324	0.163	NA	0.026		0.971	0.800			0.865	0.526	0.648		0.971		0.970	0.647		0.354		
1986	0.756	0.342	0.667	0.315			0.552	0.305	0.027	0.810	0.730	0.775	0.736		0.657	0.600			0.325	0.289	0.405		0.824		0.941	0.617		0.322		
1987	0.837	0.763	0.667	0.684			0.105	0.083	0.895	0.027	0.244	0.807	0.026		0.514	0.172			0.460	0.605	0.162		0.971		1.000	0.676		0.000		
1988	1.000	0.184	0.917	0.052			0.263	0.444	0.816	0.270	0.649	0.936	0.026		0.685	0.372			0.595	0.842	0.729		0.795		0.764	0.882		0.000		
1989	0.702	0.263	0.028	0.263			0.368	0.027	0.474	0.540	0.568	0.871	0.526		0.942	0.686			0.541	0.710	0.216		0.971		0.852	0.705		0.000		
1990	0.567	0.921	0.917	0.184			0.052	0.250	0.948	0.189	0.622	0.968	0.026		0.828	0.115			0.568	0.578	0.189		0.295		0.823	0.823		0.354		
1991	0.351	0.105	0.445	0.078			0.078	0.111	0.711	0.162	0.838	0.904	0.026		0.742	0.315			0.622	0.368	0.918		0.471		0.705	0.794		0.516		
1992	0.270	0.131	0.112	0.236			0.157	0.750	0.632	0.243	0.163	0.839	0.026		1.000	0.858			0.244	0.105	0.000		0.765		0.882	0.352		0.354		
1993	0.459	0.026	0.028	0.026			0.763	0.194	0.211	0.837	0.811	0.678	0.684		0.771	0.486			0.271	0.184	0.081		0.706		0.588	0.529		0.000		
1994	0.513	0.631	0.167	0.473			0.315	1.000	0.869	0.081	0.514	0.710	0.026		0.914	0.658			0.352	0.157	0.540		0.677		0.647	0.500		0.903		
1995	0.945	0.236	0.445	0.157			0.789	0.805	0.053	0.972	0.892	0.613	0.921		0.885	0.915			0.514	0.052	0.027		0.324		0.529	0.970		1.000		
1996	0.675	0.710	0.667	0.447			0.842	0.500	0.158	0.729	0.460	0.323	0.842		0.800	0.772			0.109	0.236	0.108		0.118		0.176	0.764		0.967		
1997	0.891	0.815	0.945	0.605			0.605	0.916	0.000	0.756	0.433	0.420	0.868		0.857	0.715			0.190	0.263	0.135		0.500		0.470	0.176		0.935		
1998	0.540	0.736	0.667	0.394			0.894	0.722	0.185	0.918	0.973	0.033	0.894		0.714	0.829			0.487	0.657	0.864		0.383		0.088	0.441		0.870		
1999	0.621	0.947	0.834	0.921			0.894	0.777	0.237	0.513	0.811	0.162	0.815		0.285	0.400			1.000	0.947	1.000		0.736		0.147	0.088		0.645		
2000	0.783	0.842	0.667	0.842			0.631	0.388	0.132	0.594	0.514	0.259	0.657		0.228	0.343			0.757	1.000	0.486		0.530		0.382	0.411		0.290		
2001	0.810	0.526	0.778	0.736			0.315	0.361	0.764	0.135	0.352	0.742	0.026		0.314	0.543			0.811	0.973	0.783		0.618		0.735	0.470		0.000		
2002	0.972	0.315	0.167	0.552			0.578	0.583	0.579	0.459	0.325	0.291	0.500		0.257	0.229			0.838	0.815	0.567		0.559		0.411	0.382		0.000		
2003	0.918	0.394	0.778	0.500			0.815	0.638	0.422	0.675	0.676	0.355	0.605		0.628	0.429			0.379	0.789	0.432		0.442		0.205	0.323		0.483		
2004	0.864	0.473	0.973	0.631			0.657	0.694	0.369	0.486	0.271	0.130	0.631		0.428	0.286			0.298	0.552	0.459		0.177		0.558	0.294		0.000		
2005	0.729	0.578	0.778	0.368			0.710	0.972	0.527	0.702	0.757	0.226	0.421		0.400	0.143			0.136	0.131	0.243		0.000		0.029	0.029		0.000		
2006	0.432	0.789	0.667	0.868			0.868	0.333	0.264	0.891	0.217	0.065	0.947		0.571	0.200			0.649	0.342	0.351		0.030		0.000	0.000		0.806		
2007	0.243	0.578	0.500	0.763			0.236	0.222	0.843	0.108	0.325	0.581	0.026		0.485	0.058			0.892	0.473	0.810		0.059		0.117	0.058		0.645		
2008	0.054	0.394	0.306	0.657			0.263	0.416	0.685	0.189	0.568	0.549	0.026		0.371	0.000			0.973	0.868	0.972		0.089		0.058	0.235		0.709		
2009	0.027	0.157	0.306	0.105			0.131	0.555	0.658	0.405	0.379	0.646	0.026		0.114	0.086			0.946	0.631	0.594		0.206		0.676	0.911		0.000		
2010	0.108	0.289	0.362	0.210			0.526	0.861	0.606	0.567	0.865	0.517	0.421		0.142	0.258			0.676	0.921	0.837		0.236		0.323	0.147		0.838		
2011	0.162	0.526	0.500	0.578			0.973	0.472	0.316	0.783	0.946	0.033	0.710		0.600	0.458			0.784	0.763	0.945		0.148		0.500	0.735		0.774		
2012	0.486	0.842	NA	0.973			0.447	0.277	0.790	0.297	0.730	0.130	0.026		0.542	0.629			0.919	0.894	0.756		0.353		0.352	0.205		0.580		
2013	0.648	0.447	0.362	0.815			0.473	0.166	0.448	0.432	0.028	0.226	0.552		0.200	0.886			0.730	0.684	0.702		0.589		0.235	0.941		0.354		
2014	0.405	0.210	0.084	0.131			0.026	0.055	0.922	0.054	0.000	0.452	0.026		0.171	0.029			0.082	0.421	0.297		0.853		0.441	1.000		NA		
2015	0.216	0.078	0.195	0.421			0.210	0.666	0.553	0.351	0.055	0.388	0.394		0.085	0.515			0.000	0.210	0.513		0.883		0.264	0.264		NA		
2016	0.135	0.052	0.056	0.289			0.500	0.944	0.343	0.621	0.163	0.484	0.578		0.342	0.743			0.028	0.447	0.378		0.265		0.617	0.117		NA		
2017	0.081	0.657	0.306	0.526			0.947	0.611	0.290	0.945	0.190	NA	0.973		0.057	0.972			0.217	0.315	0.621		NA		NA	NA		NA		
2018	0.189	0.684	0.695	0.789			0.421	0.888	0.500	0.378	0.082	NA	0.421		NA	NA			0.163	0.026	0.324		NA		NA	NA		NA		
2019	0.324	0.368	0.306	0.342			0.736	NA	0.106	0.864	0.433	NA	0.789		NA	NA			0.055	0.000	0.270		NA		NA	NA		NA		
2020	NA	0.500	0.862	0.710			0.157	NA	0.974	NA	NA	NA	0.026		NA	NA			NA	0.078	NA		NA		NA	NA		NA		