Mapping Ecologically Important Wildlife Marine Areas

We are considering identifying important areas for wildlife along the outer coast by using an overlay model similar to what was used as part of the Western Governor's Crucial Fish and Wildlife Habitat. The model is categorical in nature. Important fish and wildlife areas were assigned to one of 5 categories based on both a level of concern and sensitivity for the fish/wildlife values (Endangered and Threatened species vs common species) and level of certainty the fish/wildlife values occurred where they were mapped (known occurrences vs modeled/predicted occurrences). A 6th category was used to identify areas where none of the mapped fish and wildlife values occurred. The following table illustrates how the marine wildlife data would be assigned to 1 of 5 categories. Category "6" would be areas with none of the data below present.

Wildlife Element	Level of Significance	Level of Certainty	Assigned Category	Comments
Nearshore Zone				
Snowy Plover Breeding areas[1]	High	High	1	Occurrence Polygons around known breeding areas
Streaked Horned Lark Breeding areas[1]	High	High	1	Occurrence Polygons around known breeding areas
Tufted Puffin Breeding Colonies[2]	High	High	1	WDFW Species of Concern
High Abundance, multiple Species Seabird Breeding Colonies[2]	High	High	1	> 500 total birds (annual average) and or > 6 different species
Med Abundance, few species Seabird Breeding Colonies[2]	Med	High	3	100-500 total bird abundance (annual average) or 4-6 species
Low Abundance, few species Seabird Breeding Colonies[2]	Low	High	5	< 100 total bird abundance (annual average) or 1-3 species
Marbled Murrelet high concentration areas[3]	High	Med	2	Listed Species, encounter rate projected across transect sampling units
High concentration areas for > 5-7 seabird species[3]	High	Med	2	Out of a total of 12 resident seabird species surveyed, encounter rate
High concentration areas for 3-4 seabird species[3]	Med	Med	4	Out of a total of 12 resident seabird species surveyed, encounter rate
High concentration areas for 2 seabird species[3]	Low	Med	5	Out of a total of 12 resident seabird species surveyed, encounter rate
High priority Marine Mammal Haul Out Sites[4]	High	High	2	Harbor Seals and California and Stellar Sea Lions, sites with high pup/total ratio and/or high mean annual counts and consistent year after year use
Sea Otter Regular Concentration Areas[5]	High	Med	2	Developed from 12-13 annual WDFW/USFWS Aerial Surveys of Sea Otter counts, distribution and expert knowledge
Core Kelp Bed Areas[6]	High	High	1	Kelp present > 75% of 23 years surveyed
Other Kelp Bed Areas[6]	High	Med	2	Kelp Present 25-75% years of 23 years

Wildlife Element	Level of Significance	Level of Certainty	Assigned Category	Comments
				surveyed
Rarely Kelp Bed Areas[6]	High	Low	3	1-25% years
Colony Seabird foraging areas[2]	Med	Low Medium High	1-3 species = 5 4-7 species = 4 8-10 species =3	Modeled species specific foraging buffer around each colony feature (island, cove, point, or beach)
Pinniped foraging areas[7]	Med	Low Medium High	1 species = 5 2 species = 4 3 species = 3	Modeled 6500 m buffer around haulout sites
Harbor Porpoise High concentration areas[3]	High	Med	2	Very reliable survey blocks with limited uncertainty
Outer Ocean/Shelf Zone				
Short-tailed Albatross[8]	High	Low	50% VC = 3 95% VC = 4 99% VC = 5	Radio-telemetry kernel density map (Utilization Distribution)
Seabird distribution maps	High High	High Med	1 2	High Diversity, high likelihood Individual Species probability of occurrence maps
	Med Med	Med Low	3 4	Moderate Diversity, and or medium likelihood
	Low	Low	5	Low Density and or low likelihood
Seabird Hot Spots[9]	High	Low	1-2 species = 5 3-4 species = 4 5-7 species = 3	Distribution-based hot spot maps indicating number of species present
Colony Seabird foraging areas[2]	Med	Low Medium	1-3 species = 5 4-7 species = 4	Modeled species specific foraging buffer around each colony feature (island, cove, point, or beach)

[1]WDFW Wildlife Survey Data Management (WSDM) database; [2]Seabird colony 300m disturbance zone buffer centered on islands, coves, points, or beach sections, from WDFW database (updated in 2014); [3]WDFW At-Sea nearshore transect surveys averaged over 5 years (2009-2014); [4]WDFW Marine Mammal Haulout database, Based on 20 year aerial surveys and 300 ft disturbance zone buffer; [5]WDFW Priority Habitats and Species Sea Otter summer concentration areas 2012-2013; [6]WA Department of Natural Resources (WADNR) floating kelp long-term monitoring of the outer coast from 1989-2012; [7]WDFW Marine Mammal Haulout database, Based on 20 year aerial surveys and 6500 m foraging area buffer; [8]Telemetry data from Suryan et al. 2012. New approach for using remotely sensed chlorophyll a to identify seabird hotspots. Marine Ecology Progress Series 451: 213–225; [9]Nur et al. 2011. Where the wild things are: predicting hotspots of seabird aggregations in the California Current System. Ecological Applications 21: 2241–2257