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${\bf Appendix\ B.\ Offshore\ renewable\ energy\ impact\ matrix.}$

Level of Effect

Level of Certainty	Negligible Minor low medium high	Moderate	Major	
Level of Effect	Definition			
Negligible	• No measurable effect		11 00	
Minor	 Should not influence affected resource, active 	ity, or commur	nity.	
Moderate	 Effects could modera community, generally 	-		e, activity, or
Majan	• Effects could signific or community, general	antly influence	the resource	
Major	or community, general	y or for partice	nai species	•
Level of Certainty	Definition			
	• Limited to no docume	entation or anec	edotal evide	ence
Low	available	1 , 1	• 1	.1 1 1
Medium	• Some documentation			
Mediaiii	clear consensus amongWell documented; cor			
High	literature	sensus among	experts and	* ************************************

Benthic Habitat and Resources Scale 1

		Scale 1- Individual Device/ Demonstration Project						T	echnolo	gy Type					
				W	ind			Curi	rents				Wav	es	
				Found	datio	n		Turbin	іе Туре				Device '	Туре	
			ie	٨	lattice	oring	Open	Rotor	Shro	ouded	ber	uator	/ater	/ave rter	50
		Potential Effect	Monopile	Gravity	Tripod/ la	Floating Mooring	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuator	Oscillating Water Column	Oscillating Wave Surge Converter	Overtopping
		Changes to currents, wave regime													
		Disturbance from installation/removal device (including increased turbidity)													
		Disturbance from installation of power cable (including trenching)													
	Dhysiaal	Disturbance removal of power cable													
	Physical	Scour around structures													
		Smothering by excavated sediments													
Benthic		Reef effects													
Habitat		Increase in sediment temperature around cable													
and		Diffusion/flaking marine coating													
Resources		Leakage lubricants/fluids;Release maintenance chemicals													
	Chemical	Large spills or accidents													
		Chemicals discharged during installation or removal													
		Resuspension of pollutants in sediments													
	Acoustic	Noise and vibration before and during construction; during operation; during decomissioning													
	EMF	EMF from power cable													

Benthic Habitat and Resources Scale 2

		Scale 2- Single Commercial Scale Facility						Tec	hnology	Туре					
				Wi	nd			Curr	ents				Wave	S	
				Found	ation			Turbin	е Туре			D	evice Ty	ре	
			ile	ty	ttice	Mooring	Open	Rotor	Shro	uded	orber	e ator	Water	Wave	ping
		Potential Effect	Monopile	Gravity	Tripod/lattice	Floating M	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuat	Oscillating Water Column	Oscillating Wave Surge Converter	Overtopping
		Changes to currents, wave regime													
		Disturbance from installation/removal device (including increased turbidity)													
		Disturbance from installation of power cable (including trenching)													
	Physical	Disturbance removal of power cable													
	Pilysical	Scour around structures													
		Smothering by excavated sediments													
Danshia Habitat and		Reef effects													
Benthic Habitat and Resources		Increase in sediment temperature around cable													
Resources		Diffusion/flaking marine coating													
		Leakage lubricants/fluids; Release maintenance chemicals													
	Chemical	Large spills or accidents													
		Chemicals discharged during installation or removal													
		Resuspension of pollutants in sediments													
	Acoustic	decommissioning													
	EMF	EMF from power cable													

Fish and Fisheries Resources Scale 1

		Scale 1- Individual Device/ Demonstration Project	Technology Type Wind Currents Waves Foundation Turbine Type Device Type														
				Wind Currents Waves Foundation Turbine Type Device Type													
				Found	latio	n		Turbii	1е Туре				Device '	Гуре			
			ie	eg ju		Opei	n Rotor	Shro	uded	ber	uator	/ater	/ave erter	b0			
		Potential Effect	Monopile	Gravit	Tripod/ la	Floating Mo	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuator	Oscillating Water Column	Oscillating Wave Surge Converter	Overtopping		
		Disturbance from installation device															
	Dhysical	Disturbance from removal of device															
	Physical	Disturbance from installation of power cable															
		Disturbance removal of power cable															
		Collison/Blade Strike															
	D	Pressure gradients around rotor															
	Dynamic	Velocity gradients around rotor															
		Rotor wake															
		Diffusion/flaking marine coating															
		Leakage lubricants/fluids during operation															
	Chemical	Large spills or accidents															
		Chemicals discharged during installation or removal															
Fish		Resuspension of pollutants in sediments															
		Operational noise (gears, mooring chains, etc.)															
		Noise from pre-construction seismic surveying															
		Noise from vessels conducting project maintenance/monitoring															
		Noise from pile driving								**********					1		
	Acoustic	Noise from vessel traffic during installation															
		Noise from directional drilling for power cable															
		Noise from pile cutting during device removal															
		Noise from vessel traffic during removal															
	EMF	EMF from power cable															
	Community	Habitat alteration/community composition															
	level impacts	Reef effects (aggregation)															
		Decreased Catchability during construction															
		Decreased Catchability during operation															
		Loss of access to grounds during construction															
- :	ĺ	Loss of access to grounds during operation - mobile fishing gear															
Fisheries		Loss of access to grounds during operation - fixed and recreational fishing gear															
		Changes in species distribution															
	ĺ	Reef effects (aggregation)															
	ĺ	Damage/lost gear															

Fish and Fisheries Resources Scale 2

		Scale 2- Single Commercial Scale Facility						Tec	hnology	Туре					
				W	ind				rents				Wave	5	
				Found	lation			Turbir	е Туре			D	evice Ty		
			eje		ıttice	ooring	·	Rotor	Shro	uded	orber	e ator	Water	Wave	ping
		Potential Effect	Monopile	Gravity	Tripod/lattice	Floating Mooring	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuator	Oscillating Water Column	Oscillating Wave Surge Converter	Overtopping
		Disturbance from installation device													
	Dhuni an I	Disturbance from removal of device													
	Physical	Disturbance from installation of power cable													
		Disturbance removal of power cable													
		Collison/Blade Strike													Т
		Pressure gradients around rotor													
	Dynamic	Velocity gradients around rotor													T
		Rotor wake													T
		Diffusion/flaking marine coating													
		Leakage lubricants/fluids during operations													
	Chemical	Large spills or accidents	-											000000000	
Fish		Chemicals discharged during installation or removal													
FISH		Resuspension of pollutants in sediments													
		Operational noise (gears, mooring chains, etc.)													
		Noise from pre-construction seismic surveying													
		Noise from pile driving													
	Acoustic	Noise from vessel traffic during installation													
		Noise from directional drilling for power cable													
		Noise from pile cutting during device removal													
		Noise from vessel traffic during removal													
	EMF	EMF from power cable													
	Community														
	level	Habitat alteration/community composition													
	impacts	Reef effects (aggregation)													
		Decreased Catchability during construction													
		Decreased Catchability during operation													
		Loss of access to grounds during construction													
Fisheries		Loss of access to grounds during operation - mobile gear fisheries													
risneries		Loss of access to grounds during operation - fixed and recreational fisheries													Γ
		Changes in species distribution													
		Reef effects (aggregation)													
		Damage/lost gear													Т

Avian species Scale 1

_	•	Scale 1- Individual Device/ Demonstration Project						1	Technolo	gy Type					
				W	ind			Cur	rents				Wave	es	
				Found	datio	n		Turbii	1е Туре				Device 1	уре	
			ie	, -<	ttice	oring	Ope	n Rotor	Shro	ouded	ber	uator	Vater	Vave	b 0
		Potential Effect	Monopile	Gravity	Tripod/ lattice	Floating Mooring	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuator	Oscillating Water Column	Oscillating Wave Surge Converter	Overtopping
		Displacement or attraction to structure above surface of the water													
		Displacement or attraction to structure below surface of the water													
	Physical	Disorientation or attraction from lighting													
		Disturbance from installation device or transmission cable													
		Disturbance from removal of device or transmission cable													
		Collision with rotating turbine blades													
	Duna mi a	Pressure gradients around rotor													
	Dynamic	Velocity gradients around rotor													
		Rotor wake													
		Diffusion/flaking marine coating													
Avian		Leakage lubricants/fluids; Release maintenance chemicals													
Species	Chemical	Large spills or accidents													
		Chemicals discharged during installation or removal													
		Resuspension of pollutants in sediments													
		Operational noise (rotor, power train, cable strum)													
		Noise from pile driving													
	Acoustic	Noise from vessel traffic during installation, maintanence and removal													
		Noise from directional drilling for power cable													
		Noise from pile cutting during device removal													
	EMF	EMF from power cable													
	Enormy	Changes to foraging due to changes in turbulent dissipation/boundary layers													
	Energy	Changes to foraging due to changes to wave energy regime													

Avian species Scale 2

		Scale 2- Single Commercial Scale Facility						Te	chnology	Туре					
				Wi	nd			Cur	rents				Wave	S	
				Found	ation			Turbi	пе Туре			D	Pevice Ty	•	
			ejje	£	ıttice	ooring	Open	Rotor	Shro	ouded	orber	e ator	Water	Wave	ping
		Potential Effect	Monopile	Gravity	Tripod/lattice	Floating Mooring	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuator	Oscillating Water Column	Osdillating Wave Surge Converter	Overtopping
		Displacement or attraction to structure above surface of the water													
		Displacement or attraction to structure below surface of the water													
	Physical	Disorientation or attraction from lighting													
		Disturbance from installation device or transmission cable													
		Disturbance from removal of device or transmission cable													
		Collision with rotating turbine blades													
	D	Pressure gradients around rotor													
	Dynamic	Velocity gradient around rotor													
		Rotor wake													
		Diffusion/flaking marine coating													
Auton Consiss		Leakage lubricants/fluids; Release maintenance chemicals													
Avian Species	Chemical	Large spills or accidents													
		Chemicals discharged during installation or removal													
		Resuspension of pollutants in sediments													
		Operational noise (rotor, power train, cable strum)													
		Noise from pile driving													
	Acoustic	Noise from vessel traffic during installation, maintanence and removal													
		Noise from directional drilling for power cable													
		Noise from pile cutting during device removal													
	EMF	EMF from power cable													
	Enorma	Changes to foraging due to changes in turbulent dissipation/boundary layers													
	Energy	Changes to foraging due to changes to wave energy regime													

Marine mammals and sea turtles Scale 1

		Scale 1- Individual Device/ Demonstration Project						Т	echnolo	gy Type					
				W	ind			Curi	rents				Wav	es	
				Found	datio	n		Turbir	іе Туре				Device :	Гуре	
			<u>e</u>	٧.	ttice	oring	Open	Rotor	Shro	ouded	ber	uator	Vater	Vave erter	b0
		Potential Effect	Monopile	Gravity	Tripod/ lattice	Floating Mooring	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuator	Oscillating Water Column	Oscillating Wave Surge Converter	Overtopping
	Dhysiaal	Reef Effects													
	Physical	Englanglement with mooring lines or cables													
	Dynamic	Collision with or avoidance of rotating turbine blades													
	Dynamic	Strike by installation or support vessels													
		Diffusion/flaking marine coating													
		Leakage lubricants/fluids;Release maintenance chemicals													
Marine Mammals	Chemical	Large spills or accidents													
and Sea		Chemicals discharged during installation or removal													
Turtles		Resuspension of pollutants in sediments													
Turties		Operational noise (rotor, power train, cable strum)													
		Noise from pile driving													
	Acoustic	Noise from vessel traffic during installation or removal													
		Noise from directional drilling for power cable													
		Noise from pile cutting during device removal													
	EMF	EMF from power cable													

Marine mammals and sea turtles Scale 2

		Scale 2- Single Commercial Scale Facility						Tec	hnology	Туре					
				W	ind			Curi	rents				Wave	s	
				Found	ation			Turbin	іе Туре			E	Pevice T	уре	
			ejje	tγ	ıttice	ooring	Open	Rotor	Shro	uded	orber	e ator	Water nn	ating Wave Converter	ping
		Potential Effect	Monopile	Gravity	Tripod/lattice	Floating Mooring	Bottom Mounted	Floating Mooring	Bottom Mounted	Floating Mooring	Point Absorber	Wave Attenuato	Osdilating Water Column	Oscillating Wave Surge Converter	Overtopping
	Physical	Reef Effects													
	Physical	Englanglement with mooring lines or cables													
	D	Collision with or avoidance of rotating turbine blades													
	Dynamic	Strikes with installation or support vessels													
		Diffusion/flaking marine coating													
		Leakage lubricants/fluids;Release maintenance chemicals													
Marine Mammals	Chemical	Large spills or accidents													
and Sea Turtles		Chemicals discharged during installation or removal													
and Sea runties		Resuspension of pollutants in sediments													
		Operational noise (rotor, power train, cable strum)													
		Noise from pile driving													
	Acoustic	Noise from vessel traffic during installation or removal													
		Noise from directional drilling for power cable													
		Noise from pile cutting during device removal													
	EMF	EMF from power cable													