Table S2: Model Categorization and Descriptors Summary Table

The Primary Level Descriptors in the rows of the table are categorized into 5 major model descriptors:

- *Advisory models on the short term (tactical fisheries advice with fish stock assessment)*

  TAC (Total Allowable Catch) single stock/species; TAC, mixed fishery (several stocks and métier related; technical interactions); TAC ITQ (Individual Transferable Quotas); TAC, multi-species / multi-stock (biological interactions); TAE (Total Allowable Catch), single métier (fishery) / single fishing fleet; TAE, multiple metier / fleet; TAE ITE (Individual Transferable Effort), single vessel;

- *Assessment of outcomes of existing TAC or TAE (short term)*

  Single stock; Mixed fishery; ITQ or ITE;

- *Management Strategy Evaluation (Medium Term, Long Term)*

  Single stock; Mixed fishery; Multi-species; Sometimes fish communities (broader fish community and/or ecosystem management); ITQ; ITE;

- *Strategic Long Term Advice*

  Single stock; Multi-species; Ecological communities (fish groups or communities, e.g. pelagic/demersal, or trophic levels); Ecosystem (all fish in certain ecosystems; ecological trophic levels); Fishery system (certain fishery systems and fleets and parts of catch sector); Catch sector (full catch sector);

- *Broader Bio-Economic Advice (Medium-Long Term)*

  Catch sector; Community / County / City; National (country); International larger region; Cross Sector (certain marine sectors);

The Secondary Level Descriptors in the columns of the table are categorized into 3 major model descriptors:

- *Model Dimensions and Structure / Resolution*

  Fleets and fisheries/métiers resolution (full fishery, multiple, single vessel); Spatial resolution – local/regional/global ecosystem and high/low spatial disaggregation (VMS track, stock subarea, stock area, region, ecosystem); Time resolution – high/low disaggregation (season, year, multiple years); Biological structure (age, size, biomass);

- *Model Complexity and Flexibility*

  Complexity (simple, complex); Data need (high, low – requirement of data from special databases); Quantitative / Qualitative (quantitative, indicator based); Flexibility, generic/specific (high, medium, low); Orientation (input based such as fleet capacity and effort levels, output such as landings/catch quotas); Functions, endogeneous / exogeneous (recruitment, catchability, prices – price elasticity, costs); Values (market, non-market e.g. non-market values for certain species groups such as whales, birds, etc. with for example shadow values with the protection of species, or consumer utility functions); Follow value chain (yes – and how far, no);

- *Model Type*

  Model modules, output (ecological, economic fleet, bio-economic, management – feed-back and integration between modules or not); Behavioural modules – model human behavior (tactical, strategic, none); Coupling (static, dynamic, equilibrium) – e.g. static representation of the economy, dynamic full feed-back or micro-scale or macro-scale feedbacks, uncertainty in feed-back in relation to short/medium/long term projections or behavior, feed-back according to tactic or strategic goals of the model;

Parameter estimation (deterministic, stochastic); Interactions (linear, non-linear); Simulation / Optimization (simulation (what if), optimization (what's best), both).

Table S2. Categorization of bio-economic models according to decision support needs of the user, i.e. the types of questions the user needs answers for through the models. Purpose of the use of the model and what type of information and model do we want to use to support our objective? Your Model: DISPLACE

Primary Level Descriptors (Categories and Types of Models)		Secondary Level Descriptors, Categories and Types of Models																																																	
		Dimensions / Structure / Resolution															Complexity / Flexibility																			Model Type															
		Fleets / Fisheries (metiers) Structure				Spatial Resolution and Structure					Time Resolution			Biological Structure			Com-plexity		Data Need		Quantita-tive / Qualita-tive		Flexibility (generic / specific)			Orien-tation		Functions (endogeneous / exogeneous)				Values		Follow Value Chain		Model Modules (Output)			Behavioural modules			Coupling			Para-meter Esti-mation		Inter-actions		Simulation / Optimi-zation		
		Full Fishery	Single	Multiple	Single Vessel	VMS Track	Stock Subarea	Stock Area	Region	Ecosystem	Season	Year	Multiple Years	Age	Size	Biomass	Simple	Complex	High	Low	Quantitative	Indicat. Based	High	Medium	Low	Input	Output	Recruitment	Catchability	Prices	Costs	Market	Non Market	Yes	No	Ecological	Economic	Bio-Economic	Tactical	Strategic	No	Static	Dynamic	Equilibrium	Deterministic	Stochastic	Linear	Non Linear	Simulation	Optimization	Both
Advisory models on the short term (advice with stock assessment)	TAC, Single Spec.																																																		
	TAC, Mix. Fishery (Techn. Interactions)	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	ITQ	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	TAC, Multi-Species (Biol. Interactions)																																																		
	TAE, Single Metier / Fleet	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	TAE, Multiple Metier / Fleet	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	TAE (ITE), Single Vessel	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
Assessment of outcomes of existing TAC (short term)	Single stock																																																		
	Mix Fishery	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	ITQ	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
Impact Assessment of existing TAE (short term)	Single stock related																																																		
	Mix Fishery	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	ITE	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
Management Strategy Evaluation (Medium Term, Long Term)	Single stock																																																		
	Mix Fishery	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	Multi-Species	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	Fish Communities																																																		
	ITQ	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	ITE	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
Strategic Long Term Advice	Single Stock																																																		
	Multi-Species																																																		
	Ecol. Communities																																																		
	Ecosystem																																																		
	Fishery System	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	Catch Sector	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
Broader Bio-Economic Advice (Medium-Long Term)	Catch Sector	X		X	X	X		X	X		X		X	X	X			X	X		X			X		X	X	X	X	X	X	X			X	X	X		X	(X)			X			X		X	X		
	Community / County / City																																																		
	National (country)																																																		
	Intern. Region																																																		
	Cross Sector (which sectors)																																																		