Coastal and Marine Ecological Classification Standard (CMECS)

The GeoForm Component (GFC)

GeoTools Breakout Group
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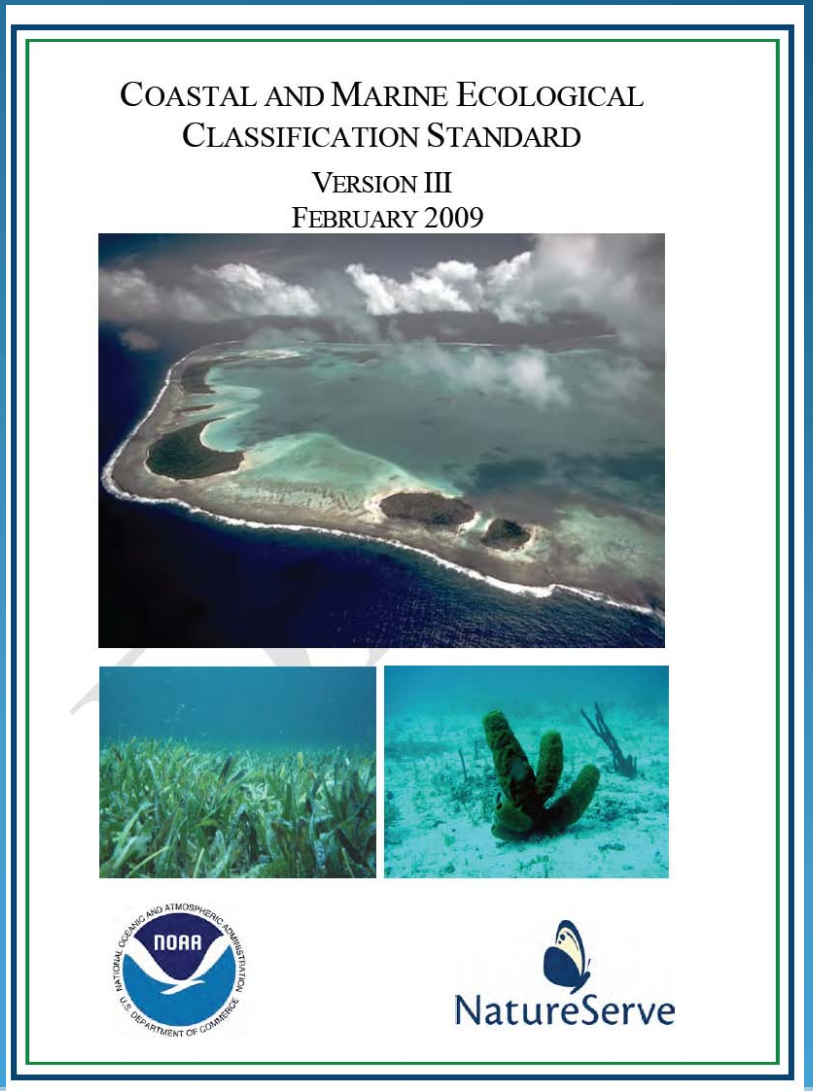
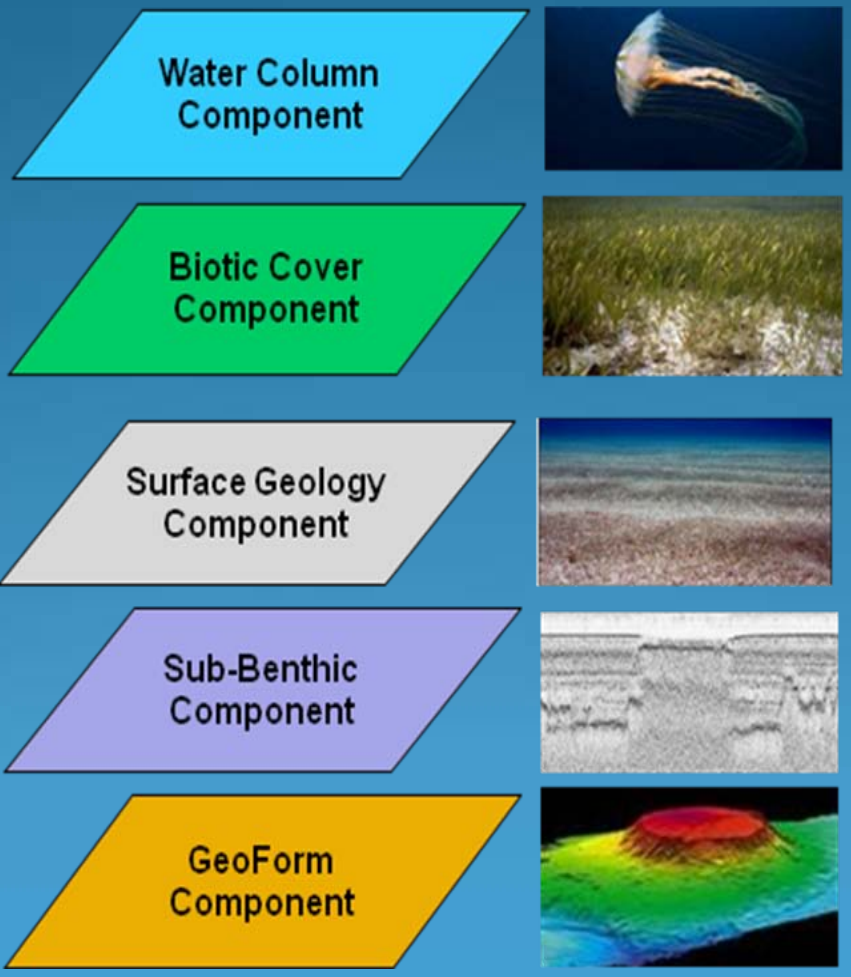


CMECS Components



CMECS Domain

Landward: tidal splash zone of the coasts, intertidal euhaline and brackish wetlands, and deepwaters of the Great Lakes.

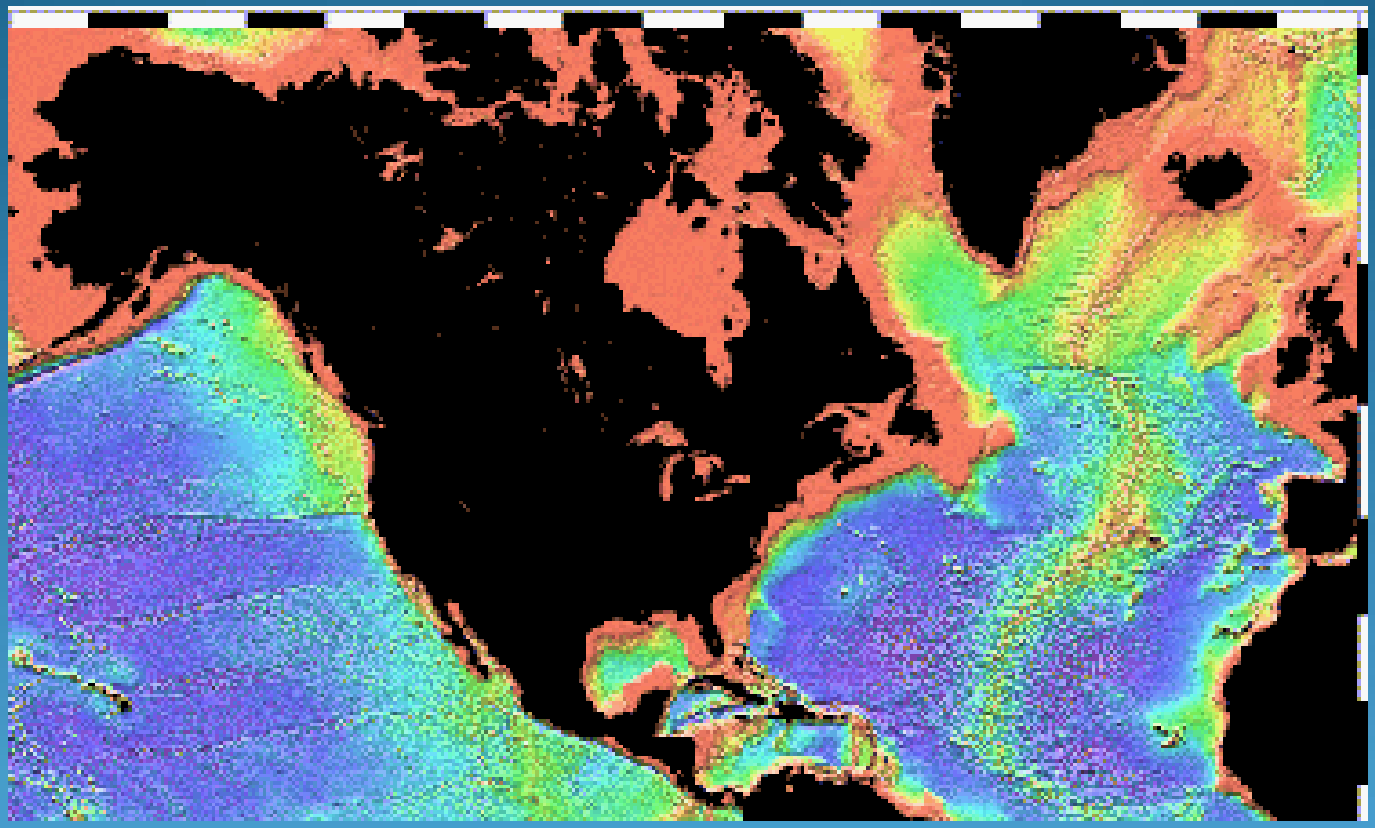
Up River/Estuary: tidally influenced areas where salinity is greater than 0.5 PSU (Practical Salinity Units) for all or part of the year.

Seaward: to the deep ocean, including all continental and ocean waters.

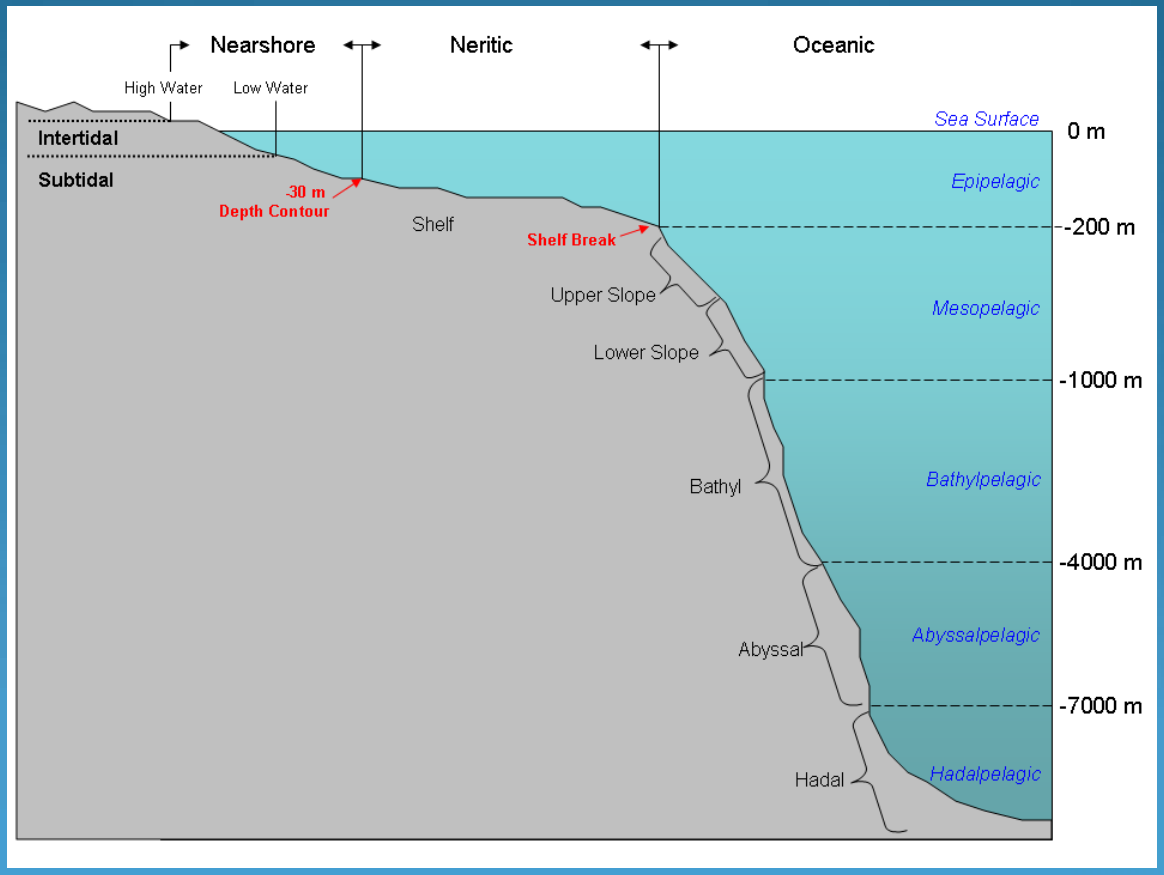
Geoform Component (GFC)

- Describes the major geomorphic or structural characteristics of the coast and seafloor at various scales
- Derived from Greene et al. with modifications
- Non-hierarchical – multi-classifier approach
  - Physiographic Province – major components of seafloor geomorphology along the continuum from the spreading center to the coast. (e.g., fracture zone, abyssal plain, continental rise, continental shelf).
  - Geoform - seafloor structures that range in size from 100's of kilometers to less than a meter (e.g., delta, embayment, channel).
  - Anthropogenic Geoform - human made structures (berm, harbor, artificial reef).

Spatial Domain



Spatial Domain



Physiographic Province	Code	Geoform (Natural)	Code	Geoform (Natural)	Code	Anthropogenic Geoform	Code
Fracture zone, spreading center	1	Apron, Deep fan, Bajada	A	Flank	F	Artificial reef	(a-r)
Mid-ocean ridge	2	Atoll	a	Flat, Floor, Seabed	f	Berm (anthropogenic)	(a-b/m)
Abyssal plain	3	Bank	m/f	Fracture, Crack, Crevice, Notch, Groove	_f	Dam, Dike	(a-g)
Oceanic bank (Plateau)	4	Basin	h	Hole, Pit, Scour Mark, Pockmark (non-karst)	h_e	Dredge deposit/Mound	(a-dm)
Continental, Island rise	5	Bay, Embayment, Sound, Bight, Fjord	q	Ice feature	i	Dredged channel, groove, trench or hole	(a-dg)
Continental, Island slope	6	Beach, relic (submerged)	b	Lagoon, Enclosed water	n	Drilling platform	(a-s)
Shelf break	7	Boulder(s)	h(b)	Landslide, Slump	l	Harbor, Marina	(a-m)
Continental shelf, island shelf	8	Canyon	c	Lava field	f_v	Jetty	(a-g)
Basin floor, borderland	9	Canyon head	c(h)	Ledge, Overhang	_d	Levee (anthropogenic)	(a-o)
Coast	10	Canyon mouth	c(m)	Moraine	i_m	Pier	(a-s)
Inland sea, Enclosed sea	11	Channel, Gully, Inlet, Tidal channel	g	Mound, Ridge, Knob	m	Seawall	(a-s/w)
		Channel bank	g/m	Overbank deposit, Levee (natural)	o	Shipwreck	(a-w)
		Delta, Fan	y	Pinnacle, cone	p	Trawl disturbance	-(a-td)
		Depression	h	Rill (linear deposit or depression)	r	Scar/Prop scar	(a-f)
		Face	_i	Rock outcrop	e	Pilings	(a-s)
		Riverine Estuary	er	Shoal	sl	Archaeological feature	(a)

Physiographic Province	Code	Geoform (Natural)	Code	Geoform (Natural)	Code	Anthropogenic Geoform	Code
		Rubble zone	h(b)l_h	Slough	h/g		
		Sand ripple	_r	Solution pit, sink, karst	k		
		Scarp, Cliff, Fault, Slump scar	s	Fjord			
		Seamount	x	Sub-estuary	es		
		Seamount crown, crest, top	x(c)	Terrace, plain	t		
		Seamount base	x(b)	Terrace/Plain - volcanic	t_v		
		Guyot, Flat-topped seamount	x(f)	Trench (natural)	T		
		Guyot base	x/f(b)	Wall	(w)		
		Sediment/sand wave	w(w)	Vent	_e		
		Sediment/sand dunes	w(d)	Tidepool	u		

GFC Examples- Riverine Estuary

GFC Examples- Embayment

GFC Examples- Lagoon

GFC Examples- Atoll

GFC Examples- Tidepool

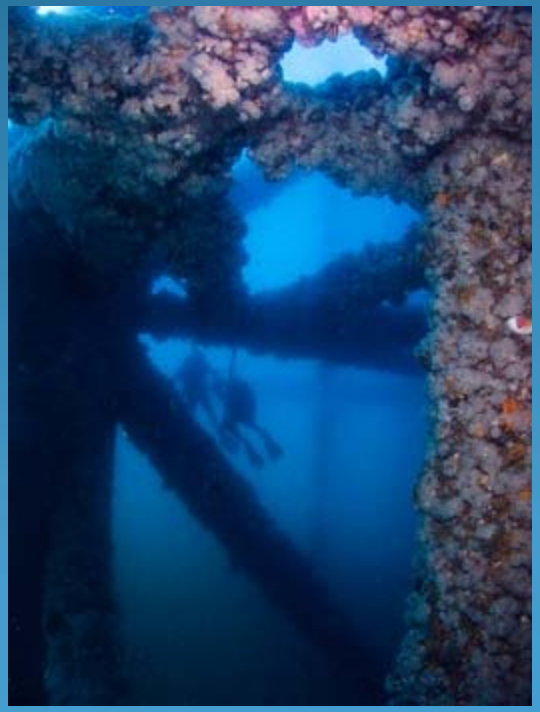
GFC Examples- Flat

GFC Examples- Inlet

GFC Examples- Channel

GFC Examples- Pilings

GFC Examples-Drilling Platform



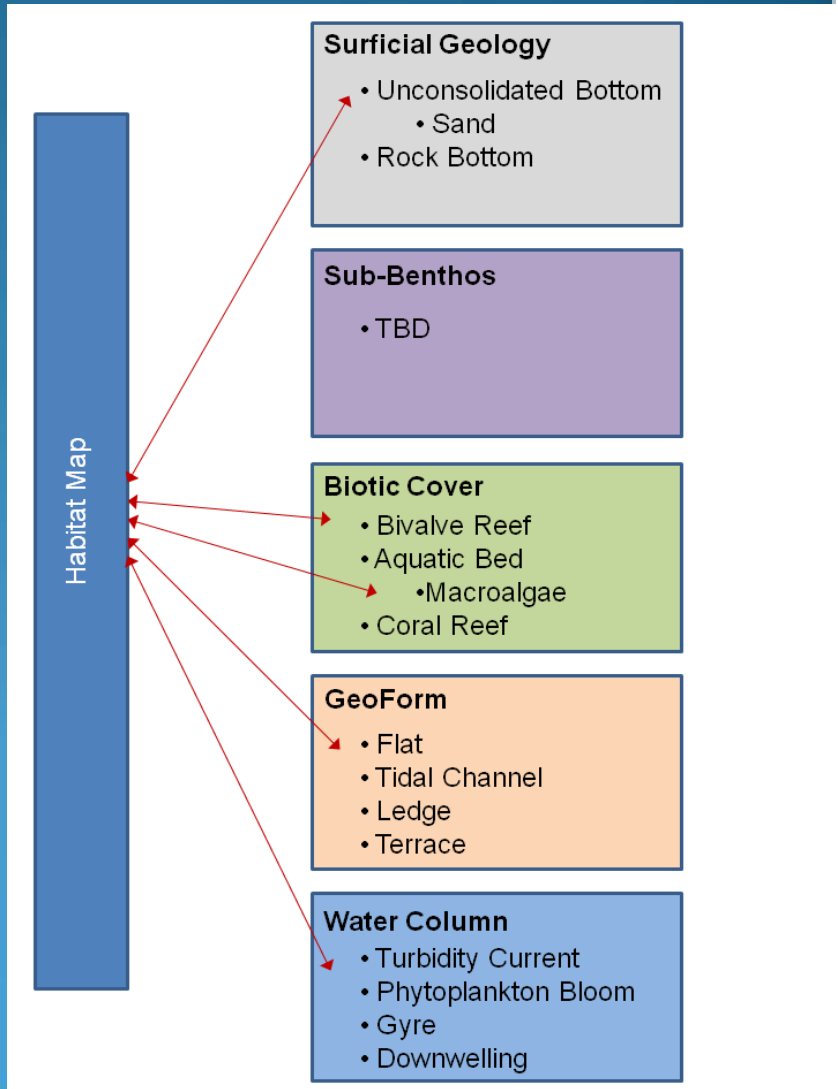
Salinity	Enclosure	Position Relative to Shelf Break	Depth Zones	Percent Cover	Energy Type	Energy Intensity
Fresh	Unenclosed	Seaward	Shallow Infralittoral	Bare/Sparse	Wind	No Energy
Oligohaline	Partially enclosed	Landward	Deep Infralittoral	Moderately Sparse	Current	Low Energy
Mesohaline	Significantly enclosed		Circalittoral	Moderate	Surface Wave	Moderate Energy
Polyhaline	Very enclosed		Circalittoral (offshore)	Moderately Dense	Internal Wave	High Energy
Euhaline	Enclosed		Mesobenthic	Complete	Tide	
Hyperhaline	Intermittent		Bathybenthic			
			Abyssalbenthic			
			Hadalbenthic			

Energy Direction	Tide Range	Primary Water Source	Profile	Slope	Temperature	Anthropogenic Impact
Upward	Microtidal	Watershed	None	Flat	Frozen	Developed
Downward	Small Tidal Range	Local Estuary Exchange	Low	Sloping	Superchilled	Impounded/Diverted
Horizontal	Moderate Tidal Range	Local Ocean Exchange	Medium	Steeply Sloping	Cold	Dredged Area/Channel
Baroclinic	Large Tidal Range	River	High	Vertical	Temperate	Deposition
Seaward		Estuary		Overhang	Warm	Contaminated
Circular		Marine			Hot	Trawled/Harvested
Mixed						Restored Area
						Scarred
						Aquaculture

Mapping CMECS

- Can draw from several components to create one map

- SGC and BCC units can be combined to create complete benthic cover maps.



GFC- Summary

- Quasi-hierarchical
- Determined by geomorphology, physics
- Scale-independent below Physiographic Province
- Separates geological composition into Surface Geology Component
- Works in tandem with Biotic Cover and Surficial Geology to generate comprehensive bottom cover