

METADATA

The 2007 benthic cover data is given in an ArcMap shapefile format and consists of six associated files:

1. Heron_2007_benthic_Data_PhotoTransect
2. Heron_2007_benthic_Data_PhotoTransect.dbf
3. Heron_2007_benthic_Data_PhotoTransect.prj
4. Heron_2007_benthic_Data_PhotoTransect.sbn
5. Heron_2007_benthic_Data_PhotoTransect.shx
6. Heron_2007_benthic_Data_PhotoTransect.sbx

Data in the *.dbf file are in a tabular format where each line corresponds to a one sample point /photo. The columns for each line give all the associated information for the particular sample photo. Cover for a given benthic class are expressed in percentage based on the 24 points scored for each photo. A description of the column header titles is given by Table 1.

Table 1. Column header description (Note: Fill color in major categories and sub categories denote linkage)

Heading	Heading Info	Notes
ID	Unique number for each data point	
Transect_n	Transect name	
Trans_date	Transect date	
Photo_name	Associated benthic photo	
Source	Place of origin of the data (Center and/or University)	
Contact	Person directly responsible with the data creation	
Analysis	Person who analysed the photos	
EASTWGS84	Eastings in meters	
NorthWGS84	Northings in meters	
Depth	Water depth at time of photo acquisition	
Major categories (Basic)		
C	CORAL	Can recognise corallites and coral is not white or overgrown with turf or coralline algae and morphology described according to (Veron et al 2000)
SC	SOFT CORAL	Not a hard coral, 8 tentacles per polyp, soft, leathery, sometimes colourful
DC	DEAD CORAL	Can recognise corallites and coral is overgrown with turf when white it is recently dead
SG	SEAGRASS	Grass like flowering plant, not macro algae and in generally green if epiphytes notes can be made
MAC	MACRO ALGAE CALCAREOUS	Large algae with a calcium carbonate framework
MA	MACRO ALGAE NON CALCAREOUS	Large algae without a calcium carbonate framework
COA	CYANO BACTERIA AND OTHER ALGAE	Small algae / microalgae with no distinct morphology and may be filamentous
SU	SUBSTRATE	Anything which forms the reef bottom and which has not been colonised by coral, algae or seagrass on top. In generally it is hard and it can be differentiated between moving and not moving.
O	OTHER	Any thing which is not a plant, coral or any substrate categories listed here
TWS	TAPE, WAND, SHADOW	View of the bottom cover obscured by field instrument or shadow, out of focus, overview photo
Sub categories		
Coral		

LBC	Live Branching Coarse (LBC)	Branching but you can stick your fingers through (Veron et al 2000)
LBF	Live Branching Fine (LBF)	Branching but you cannot stick your fingers through (Veron et al 2000)
LD	Live Digitate (LD)	Small finger like projections
LE	Live Encrusting (LE)	A layer of coral which growth over a hard substrate (Dead Coral or Rock) (Veron et al 2000)
LF	Live Foliose (LF)	Leaf like (Veron et al 2000)
LFL	Live Free Living (LFL)	Disk like or Free living coral can move (Veron et al 2000)
LM	Live Massive (LM)	Massive hard thick round big or also sub massive where from a distance it looks like one complete shape. (Veron et al 2000)
LSM	Live Sub Massive (LSM)	Single part which you can pull out of base or sticks out like a single finger (Veron et al 2000), columnar, finger like projections thicker than digitate
LT	Live Tabular (LT)	It looks like a table and not like a little bush, it is flat on the top and it is solid or perforated (Veron et al 2000)
Soft Coral		
LSC	Live Soft (LSC)	Coral with no hard skeleton
Dead Coral		
DSTT	Dead Tabular Turf (DSTT)	Solid plate like coral overgrown with turf (small layer of algae)
DBCC	Dead Branching Coarse CCA (DBCC)	Branching but you can stick your fingers through overgrown with crustose coralline algae
DBCT	Dead Branching Coarse Turf (DBCT)	Branching but you can stick your fingers through overgrown with turf (small layer of algae)
DBFC	Dead Branching Fine CCA (DBFC)	Branching but you cannot stick your fingers through overgrown with crustose coralline algae
DBFT	Dead Branching Fine Turf (DBFT)	Branching but you cannot stick your fingers through overgrown with turf (small layer of algae)
DEC	Dead Encrusting CCA (DEC)	A layer of coral which growth over a hard substrate (dead coral or rock) overgrown with crustose coralline algae
DET	Dead Encrusting Turf (DET)	A layer of coral which growth over a hard substrate (dead coral or rock) overgrown with turf (small layer of algae)
DFC	Dead Foliose CCA (DFC)	Leave like overgrown with crustose coralline algae
DFT	Dead Foliose Turf (DFT)	Leave like overgrown with turf (small layer of algae)

DFLC	Dead Free Living CCA (DFLC)	Free living coral can move overgrown with crustose coralline algae
DFLT	Dead Free Living Turf (DFLT)	Free living coral can move overgrown with turf (small layer of algae)
DMC	Dead Massive CCA (DMC)	Massive hard thick round big where from a distance it looks like one complete shape. Overgrown with crustose coralline algae
DMT	Dead Massive Turf (DMT)	Massive hard thick round big where from a distance it looks like one complete shape. Overgrown with turf (small layer of algae)
DSMC	Dead Sub Massive CCA (DSMC)	Single part which you can pull out of base or sticks out like a single finger, columnar, overgrown with crustose coralline algae
DSMT	Dead Sub Massive Turf (DSMT)	Single part which you can pull out of base or sticks out like a single finger, columnar, overgrown with turf (small layer of algae)
DDT	Dead Digitate Turf (DDT)	A layer of coral which growth over a hard substrate (dead coral or rock) overgrown with turf (small layer of algae)
T_DT	Dead Tabular All	Total percentage of dead coral subcategories that is tabular (subcategories included: DSTT)
T_DBC	Dead Branching Coarse All	Total percentage of dead coral subcategories that is branching coarse (subcategories included: DBCC, DBCT)
T_DBF	Dead Branching Fine All	Total percentage of dead coral subcategories that is branching fine (DBFC, DBFT)
T_DE	Dead Encrusting All	Total percentage of dead coral subcategories that is encrusting (DET, DEC)
T_DF	Dead Foliose All	Total percentage of dead coral subcategories that is foliose (DFC, DFT)
T_DFL	Dead Free Living All	Total percentage of dead coral subcategories that is free living (DFLC, DFLT)
T_DM	Dead Massive All	Total percentage of dead coral subcategories that is massive (DMC, DMT)
T_DSM	Dead Sub Massive All	Total percentage of dead coral subcategories that is sub massive (DSMC, DSMT)
T_DD	Dead Digitate All	Total percentage of dead coral subcategories that is digitate (DDT)
Seagrass		
SGHO	<i>Halophila ovalis</i> (SGHO)	Oval to oblong like leaf, leaf margins smooth, no leaf hairs (Waycott et al. 2005)
SGD	Seagrass detritus (SGD)	Dead seagrass floating around on benthos of mixed with other dead stuff

SGOT	Seagrass – Species Unknown (SGOT)	Unknown species of seagrass
Macro Algae Calcareous		
ACH	<i>Halimeda</i> (ACH)	Green calcareous algae, form looks like little leaves which looked to be stacked on top of each other
ACO	Macroalgae -Calcareous – Species Unknown (ACO)	Unknown species of calcareous macroalgae
ACP	<i>Padina</i> (ACP)	White calcareous semi circle shapes in leave like forms
ACU	<i>Udotea</i> (ACU)	Green calcareous fan like shape
Macro Algae Non Calcareous		
ACA	<i>Caulerpa</i> (ACA)	Green, grape like connected through green roots looking structures branching over the substrate
ATG	<i>Chlorodesmis</i> (ATG)	Bunch of green grass like form, also known as turtle weed also known as turtle grass (TG)
ACHN	<i>Chnoospora</i> (ACHN)	Intricate spongy clumps or mats usually 15 cm or more across made up of repeatedly forked and entangled branches which may be somewhat flattened by not ribbon-like
ACS	<i>Colpomenia sinuosa</i> (ACS)	Rounded or irregular gas filled vesicles, usually 2-6 cm diameter
ADI	<i>Dictyota</i> (ADI)	Brown branching algae with little round tips
AHY	<i>Hydroclathrus</i> (AHY)	Sac-like thallus with perforations throughout. Resembles a brown, soft Swiss cheese. Few to several cm in length. Net-like structure.
ALA	<i>Laurentia</i> (ALA)	Brown, Green, Red looking branching algae oft in little bushes
ALO	<i>Lobophora</i> (ALO)	Brown orange semi circle shapes in leave like forms
AOT	Macro Algae Non-Calcareous - Species Unknown (AOT)	Unknown species of non-calcareous macroalgae
ASA	<i>Sargassum</i> (ASA)	Brown colour, as if floating in the water column due to air bubbles trapped in little chambers
ATU	<i>Turbinaria</i> (ATU)	Brown colour looks like <i>Sargassum</i> but with little brown trumpets
Cyanobacteria and other algae		
CABR	Branching Coralline Algae (CABR)	Coralline algae with a branching form
CARO	Crustose Coralline Algae on Rock (CARO)	Rock with crustose coralline algae on it

CARU	Crustose Coralline Algae on Rubble (CARU)	Rubble with crustose coralline algae on it
MCS	Cyano on Sediment (MCS)	Hairy like strings of cyano bacteria on sand in generally longer and higher then MPB or turf
MCO	Cyano-other (MCO)	Cyano bacteria on coral, algae, seagrass, gorgonion
MCRO	Cyano-rock (MCRO)	Cyano bacteria on rock
MCRU	Cyano-rubble (MCRU)	Cyano bacteria on rubble
TADE	Dense Turf (TADE)	Dense enough such that you cannot see the bottom type on which it is growing on
MPS	MPB on Sediment (MPS)	Microphytobenthos (MPB) on sand where there is sand patches visible (every CPCe point could have MPB but still sand visible)
MPM	MPB-mat (MPM)	Microphytobenthos (MPB) is covering completely image and no sand patches are visible so is always 100% cover.
TARO	Turf on rock (TARO)	Turf not higher then 1 cm overgrowing on a rock
TARU	Turf on rubble (TARU)	Turf not higher then 1 cm overgrowing on a rubble
Substrate		
SP	Pavement (SP)	Flat hard bottom having a low relief
SR	Rock Clean (SR)	Cannot be moved, cannot recognise it as coral, cannot see corallites, nothing growth on it
SRU	Rubble (SRU)	Can be moved, and can be held in one hand
SS	Sediment (SS)	Can be moved, can be held in one hand but falls out easy because it is small previously this was sand light dark, or silt mud
Other		
OGC	Clam (OGC)	Clam
OCS	Crown of Thorns (OCS)	Crown of Thorns Starfish
OG	Gorgonians (OG)	Gorgonian
OSP	Sponge (OSP)	Sponge
OSF	Star Fish (OSF)	Star fish
OUR	Urchins (OUR)	Sea urchin
OZ	Zoanthid (OZ)	Zoanthid
Totals Categories (Derived from a particular set of subcategories)		
T_C_C	Total CCA on coral	Derived from the Subcategories with crustose coralline algae on a coral: DBCC, DBFC, DEC, DFC, DFCL, DMC, DSMC
T_T_C	Total Turf on coral	Derived from the Subcategories with turf algae on a coral (subcategories included: DSTT, DBCT, DBFT, DET, DFT, DFLT, DMT, DSMT, DDT)

T_C_S	Total CCA on substrate	Derived from the Subcategories with crustose coralline algae on a substrate: CARO, CARU
T_T_S	Total Turf on substrate	Derived from the Subcategories with turf algae on a substrate : TADE, TARO, TARU
T_CCA	Total CCA	Derived from the Totals Categories with crustose coralline algae: T_C_C , T_C_S
T_TUR	Total Turf	Derived from the Totals Categories with turf algae (subcategories included: T_T_C , T_T_S)
T_MPB	Total MPB	Derived from the Subcategories with microphytobenthos: MPS, MPM
T_CYA	Total Cyano	Derived from the Subcategories with cyanobacteria: MCS, MCO, MCRO, MCRU
T_Rub	Total Rubble	Derived from the Subcategories with rubble: CARU, MCRU, TARU, SRU
T_ROC	Total Rock	Derived from the Subcategories with rock: CARO, MCRO, TARO, SR
T_SED	Total Sediment	Derived from the Subcategories with sediment (subcategories: MCS, MPS, SS)
Major Categories (Extensive) - Some derived from a set of subcategories		
N_C	CORAL	Derived from Major Category (Basic): Coral "C"
N_SC	SOFT CORAL	Derived from Major Category (Basic): Soft Coral "SC"
N_DC	DEAD CORAL	Derived from Major Category (Basic): Dead Coral "DC"
N_SG	SEAGRASS	Derived from Major Category (Basic): Seagrass "SG"
N_MAC	MACRO ALGAE CALCAREOUS	Derived from Major Category (Basic): Macroalgae Calcareous "MAC"
N_MA	MACRO ALGAE NON CALCAREOUS	Derived from Major Category (Basic): Macroalgae Non Calcareous "MA"
N_TRU	Total Rubble	Derived from Totals Category: T_Rub
N_TRO	Total Rock	Derived from Totals Category: T_ROC
N_TSED	Total Sediment	Derived from Totals Category: TSED
N_TPA	Pavement (SP)	Derived from Sub Category: Pavement "SP"
N_OTCY	OTHER + CyanoOther	Derived from Major Category Other and Subcategory "MCO"
N_NOTS	TAPE, WAND, SHADOW	Derived from Major Category: Tape, Wand and Shadow "TWS"
N_TSUB	Total Sediment, Rubble, Rock, Pavement	Derived from Major Categories (Extensive): N_TRU, N_TRO, N_TSED, N_TPA, N_OTCY
TAPE, WAND, SHADOW		
DK	Don't Know (DK)	Cannot determine substrate cover type
OF	Out of Focus (OF)	Photo is out of focus
OV	Overview (OV)	Overview image, not included in photo scoring

Shade	Shade (Shade)	Picture is in the shade
Tape	Tape (Tape)	View obstructed by transect tape
Wand	Wand (Wand)	View obstructed by wand or other instrument/equipment
NOTES (% of photo)		
NB	Bleached Coral or Algae	Corallites are visible no turf or coralline algae on top, pale, fluoro, and white surface bleaching
NCD	Coral disease	Corallites are visible no turf or coralline algae on top and fluoro surface bleaching
NCS	Coral scars	Corallites are visible no turf or coralline algae on top and completely white bleaching
NSE	Seagrass Epiphyte present	A photosynthetic organism the lives on the surface of seagrass blades