

SBC-LTER Fish Protocol

General Notes

The purpose of fish sampling is to determine the abundance, size, and species composition of reef fish on each transect. The observer always notes visibility for the transect using the meter tape as a guide. Fish species are recorded using four letter species codes where the code generally represents the first letter of the genus followed by the first three letters of the species name. For example, kelp bass, *Paralabrax clathratus* = PCLA.

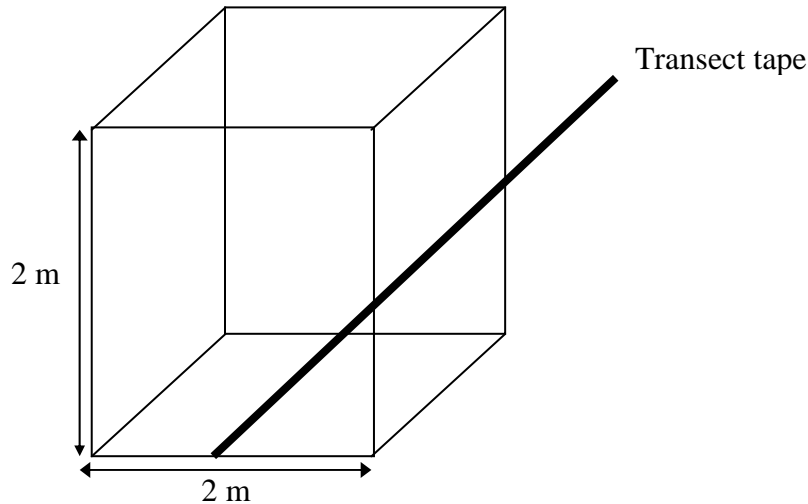
SBC LTER fish sampling is conducted monthly at three primary production sites and annually at all benthic monitoring sites. Transects at each are sampled annually in the mid summer to monitor the kelp forest community. Each site has 2-8 permanent 40 meter (m) transects marked at the beginning by either subsurface buoys or tygon tubing. Each transect has six permanent markers (tagged eyebolts or rebar stakes) placed at distances of 0, 8, 16, 24, 32, and 40 m along the transect. Hereafter, the permanent markers (bolts or rebar) will be referred to as bolts. Most transects run parallel to shore from west to east, generally at headings of 80° or 90°.

Fish Sampling

- Before sampling is begun, a surveyor's transect tape is attached to the 0m bolt, strung through the eyes of the 8, 16, 24, 32, and 40m bolts of the transect, pulled taut, and attached to the 40m bolt.
- Sampling is then begun no sooner than 5 minutes after o count fish, an observer swims the length of the 40m transect, approximately 1m above the substrate, recording the abundance and size of all fish individuals encountered within a predefined imaginary "cube".
- The "cube" extends 1m on either side of the transect tape (2m across) and 2m up from the substrate (2m high) (Fig. 1).
- The diver samples by scanning ahead frequently to record any transient species that pass through the "cube" while also searching beneath understory algae.
- Every fish sighted within the sampling area during the survey is scored.
- Care is taken by the diver to count only fish that enter the "cube". Some fish species (e.g. seniorita, *Oxyjulis californica* and kelp bass, *Paralabrax clathratus*) are attracted to divers and will follow the diver, re-entering the sampling "cube" several times. Therefore, fish that enter the sampling "cube" from behind the observer are not counted.
- A total area of 80 m² is sampled.
- Size intervals are printed on the edges of slates for divers to reference.

Fish Sampling Cont.

Fig1. Fish sampling “cube”



Fish species List

Below is the SBC LTER fish sampling list. Additions to this list are made when necessary. Following the four letter naming convention stated earlier in the protocol.

SPECIES CODE	GENUS	SPECIES	COMMON NAME
NF	No fish	.	no fish present
AHOL	Alloclinus	holderi	island kelpfish
BFRE	Brachyistius	frenatus	kelp surfperch
BOTH	Bothid	spp.	flatfish, unidentified sp.
BRAY	Myliobatis	californica	bat ray
CLIN	Gibbonsia	species	kelpfish, unidentified sp.
CNIC	Coryphopterus	nicholsii	blackeye goby
COTT	Cottid	spp.	sculpin, unidentified sp.
CPUN	Chromis	punctipinnis	blacksmith
CSTI	Citharichthys	stigmaeus	speckled sanddab
CVEN	Cephaloscyllium	ventriosum	swell shark
DVAC	Damalichthys	vacca	pile surfperch
EJAC	Embiotoca	jacksoni	black surfperch
ELAT	Embiotoca	lateralis	striped surfperch
EMBI	Emdiotica	spp.	surfperch, unidentified sp.
GMON	Gibbonsia	montereyensis	crevice kelpfish
GNIG	Girella	nigricans	opaleye
HCAR	Hypsurus	caryi	rainbow surfperch
HDEC	Hexagrammos	decagrammus	kelp greenling
HROS	Heterostichus	rostratus	giant kelpfish

HRUB	Hypsypops	rubicundus	garibaldi
HSEM	Halichoeres	semicinctus	rock wrasse
LDAL	Lythrypnus	dalli	bluebanded goby
LHIR	Leiocottus	hirundo	lavender sculpin
MCAL	Medialuna	californiensis	halfmoon
NBLA	Neoclinus	blanchardi	sarcastic fringehead
OCAL	Oxyjulis	californica	senorita
OELO	Ophiodon	elongatus	lingcod
OPIC	Oxylebius	pictus	painted greenling
PCAL	Paralichthys	californicus	california halibut
PCLA	Paralabrax	clathratus	kelp bass
PFUR	Phanerodon	furcatus	white surfperch
PNEB	Paralabrax	nebulifer	barred sandbass
PNOT	Porichthys	notatus	plainfin midshipman
RTOX	Rhacochilus	toxotes	rubberlip surfperch
SATR	Sebastes	atrovirens	kelp rockfish
SCAL	Squatina	californica	pacific angel shark
SCAR	Sebastes	carnatus	gopher rockfish
SCAU	Sebastes	caurinus	copper rockfish
SCHR	Sebastes	chrysomelas	black and yellow rockfish
SCSP	Sebastes	spp.	
SGIG	Stereolepis	gigas	giant sea bass
SGUT	Scorpaena	guttata	california scorpionfish
SMAR	Scorpaenichthys	marmoratus	cabezon
SMYS	Sebastes	mystinus	blue rockfish
SPUL	Semicossyphus	pulcher	california sheephead
SSER	Sebastes	serranoides	olive rockfish
STRE	Sebastes	serriceps	treefish
SYNG	Syngnathus	spp.	pipefish, unidentified sp.
TSEM	Triakis	semifasciata	leopard shark
OTRI	Orthonopias	triacis	snubnosed sculpin