



## Southern California Association of Marine Invertebrate Taxonomists

October, 2003

### SCAMIT Newsletter

Vol. 22, No. 6

<b>SUBJECT:</b>	<b>B'03 Polychaetes continued - <i>Polycirrus</i> spp, Magelonidae, Lumbrineridae, and <i>Glycera americana/ G. pacifica/G. nana.</i></b>
<b>GUEST SPEAKER:</b>	<b>none</b>
<b>DATE:</b>	<b>12 Jaunuary 2004</b>
<b>TIME:</b>	<b>9:30 a.m. to 3:30 p. m.</b>
<b>LOCATION:</b>	<b>LACMNH - Worm Lab</b>



*Piromis* sp A fide Harris 1985  
Anterior dorsal view. Image by R. Rowe  
City of San Diego  
ITP Regional 2701 rep. 1, 24July00, depth 264 ft.

#### SWITCHED AT BIRTH

The reader may notice that although this is only the October newsletter, the minutes from the November meeting are included. This is not proof positive that time travel is possible, but reflects the mysterious translocation of minutes from the September meeting to a foster home in Detroit. Since the November minutes were typed and ready to go, rather than delay yet another newsletter during this time of frantic “catching up”, your secretary made the decision to go with what was available. Let me assure everyone that the September minutes will be included in next month’s newsletter.  
Megan Lilly (CSD)

#### NOVEMBER MINUTES

The October SCAMIT meeting on miscellaneous polychaete issues was cancelled due to the wildfire situation in Southern California. It has been rescheduled for January

12<sup>th</sup>. The scheduled topics remain: 1) *Polycirrus* spp, 2) Magelonidae, 3) Lumbrineridae, and 4) *Glycera americana*/*G. pacifica*/*G. nana*.

Please remember that the end of December is the deadline for turning in your ballots for the recommended Constitutional changes that appeared in the last newsletter. The ballots should be sent to Vice President Leslie Harris.

The Southern California Academy of Sciences is hosting their annual meeting at California State University, Long Beach (CSULB) on May 14<sup>th</sup> – 15<sup>th</sup>. Dr. Donald J. Reish, the CSULB professor so instrumental in the formation and growth of SCAMIT, will be receiving the first Wheeler North Memorial Award at the SCAS meetings. Kelvin Barwick is working with John Dorsey and Rick Rowe, two of Dr. Reish's former students, to create a SCAMIT hosted one-day symposium, "Ecology and Taxonomy of Marine Invertebrates: Honoring the Legacy of Donald J. Reish." If you are interested in presenting, please contact Kelvin, John, or Rick.

A series of informal micro-mollusk talks has been organized to help graduate students at Scripps Institute of Oceanography with taxonomic identifications. Dr. James McLean hosted the first meeting covering gastropods at the Natural History Museum on December 6<sup>th</sup>. The second talk will be held with Dr. Paul Scott on January 17<sup>th</sup> at Scripps. Members interested in participating should contact Larry Lovell for more details. Don Cadien provides an overview of the first meeting later in this Newsletter.

On Saturday, January 24<sup>th</sup> 2004, the annual Southern California Unified Malacologists, a.k.a. SCUM, meeting will be held. Member Ron Velarde is organizing the meeting this year. It will be held at the Cabrillo Marine Aquarium in San Pedro. Please let Ron know if you will be attending so arrangements can be

made to accommodate all expected participants. If you don't have his contact information, RSVP to Secretary Megan Lilly at the addresses listed in this Newsletter.

The guest speaker for our meeting on Monday, November 17<sup>th</sup> was Dr. Sergio Salazar-Vallejo from ECOSUR in Mexico, who is currently on sabbatical. He has spent the last few months working on a revision of the polychaete family, Flabelligeridae. He presented his recent findings on California flabelligerids at this meeting. He reviewed the six genera Hartman included in her *Atlas of Polychaetous Annelids from California*; *Brada*, *Flabelliderma*, *Flabelligera*, *Ilyphagus*, *Pherusa* and *Piromis*. Sergio distributed a handout at the meeting, which summarizes his comments and current opinions on these genera and some of the local species. The handout will be distributed as an attachment to a future newsletter. After discussing the handouts and commenting on problems within the genera, Dr. Salazar-Vallejo used projected images to demonstrate diagnostic characters.

The first slide was of the anterior fragment of the holotype of *Pherusa negligens* which has very long neurosetae with hooded tips. This character is unique.

Sergio then showed images of *Ilyphagus* with its flat, short, sausage-like body that he mentioned in his handout.

Next was a slide of a *Stylariodes* from the Philippines, which had many long filaments in the cephalic cage region. The pygidium tapered and the setae were bluntly rounded. Sergio may erect a genus for this species.

At lunch we were treated to delicious homemade Chicken Mole with Spanish rice and salad, compliments of Sergio and Leslie Harris. Guest speakers making native dishes for our lunch is an enjoyable addition to a SCAMIT meeting. It was decided we might have to produce a SCAMIT cookbook (the recipe for polychaete cheese-log at last?).



After lunch Sergio explained and demonstrated his technique for cleaning flabelligerid specimens. He places the specimen in a small dish of undiluted white vinegar and then, under the microscope, gently brushes the specimen using a small, thin brush. He has been using this technique for quite some time, and it doesn't damage the papilla or the setae on the animal. Cleaning the specimen allows characters to be viewed more easily.

We then examined flabelligerid specimens that members brought to the meeting. Tom Parker (LACSD) brought a *Pherusa*-like animal to share from deep water (500+) off the Palos Verdes Peninsula. Members thought it might be *Diplocirrus micans* Fauchald 1972 when some long filaments appearing to be branchiae were found emerging from the retracted anterior end. However, further examination by Sergio proved that this animal really didn't fit into either *Pherusa* or *Diplocirrus*. It didn't have the branchiae described for *Diplocirrus*, and the close-set annulations and foliose tips on the setae fit neither genus. For now it will be called *Pherusa?* sp, and a voucher sheet is being prepared by Tom Parker to help members working on Bight '03 samples that might encounter this deep water animal. This specimen demonstrated Sergio's point that the family is in need of revision.

Rick Rowe provided the next specimen for examination. The specimen, from a shallow (13m) San Diego Bight '98 sample, was originally referred to *Pherusa* "*capulata*" but subsequently reported as *Piromis* sp SD1. The specimen (and several additional specimens from other Bight '98 shallow samples) had numerous cirriform branchiae and hooked, bifid neurosetae, both characters of *Piromis*. Rick will issue a voucher sheet for *Piromis* sp SD1 and report that it has four groups of multiple small, digitate papillae across the dorsum of anterior parapodia. The common *Piromis* sp A has two very large, triangular papillae on the dorsum of each anterior setiger. Sergio commented that *Pherusa capulata*

should be placed in the genus *Piromis*. *Piromis* sp SD1 is very similar to *Pherusa capulata* and may prove to be synonymous when compared to type material.

Rick also brought another flabelligerid, a *Pherusa negligens*, from San Diego's station B-13 at 380ft depth. Sergio examined it and said it didn't have *Pherusa* hooks, but it did have 8 cirriform branchiae with cilia arranged in rings. He noticed that the setae have a hood that is difficult to see. The striations on the setae make it look articulated, but it is not. This specimen had setae that transition in width; the lateral setae were widest, and the ventral setae were thinnest. Sergio had not seen that in *Pherusa* before. Otherwise he thought the animal was probably *Pherusa negligens*. Sergio is awaiting additional material from the type locality before finalizing the identification. A voucher sheet for *Pherusa cf negligens* was released by Rowe and Velarde in 1996, although recently the City of San Diego has dropped the "cf" from the taxon name.

We then examined a large specimen brought by Tom Parker (LACSD) of *Brada pluribranchiata* from 152m. Sergio brushed some of the sediment off while it was in undiluted white vinegar. Leslie Harris, Larry Lovell, and Tony Phillips all commented that they hadn't seen *Brada* with such long setae before. This might be due to the very large size of the specimen. Rick Rowe then shared with us a much smaller specimen of *B. pluribranchiata* that he had brought to the meeting from San Diego's station B-4 at 267 ft. depth. It definitely had much shorter setae. As Sergio discusses in his handout, until he can examine the type specimens of *B. sachalina*, which might be difficult to obtain from the former USSR, the name of both of these specimens should remain *B. pluribranchiata*.

The last animal examined was from Kristian Fauchald labeled *Diplocirrus micans* that was deposited at the museum. This was not type material but rather original material referred to



in the original description. When we compared this *D. micans* to the provisional *Pherusa?* sp specimen Tom Parker first shared with the group, we found that the *Diplocirrus micans* specimen didn't have the annulations on the neurosetae illustrated in the original description by Fauchald 1972 plate 44, pg. 509. The annulations were much closer together than illustrated, and the neurosetae hooked (bent) terminally, both characters indicating that either Fauchald had a mixed lot, or *D. micans* does not belong in the genus *Diplocirrus*. Sergio will examine the type specimens to clarify the taxonomy.

Lastly, Rick Rowe handed out a voucher sheet for *Magelona* sp B and showed some images of *Lumbrineriopsis* sp SD1.

We left the meeting knowing that Dr. Salazar-Vallejo has a lot of work ahead of him revising this family, and we thank him greatly for his time spent on our local material.

### **MICRO-MOLLUSK WORKSHOP Part I**

We held the first of two micro-mollusk identification meetings organized by Larry Lovell (SIO) on 6 December 2003. Participants included Dr. James McLean (Curator Emeritus, Natural History Museum of Los Angeles County), Dr. Doug Ernisse (California State University, Fullerton), Larry Lovell (Curator of Invertebrates, Scripps Institute of Oceanography), Kelvin Barwick (SCAMIT president and CSDMWWD), Tony Phillips (CLAEMD), Don Cadien (CSDLAC), Bonnie Becker (Cabrillo National Monument), Ben Pister (UCSD), Christine Whitcraft (SIO), Tonya Huff (SIO), and Kim Whiteside (CSUF). We met in the mollusk area upstairs at the Natural History Museum so we would have access to Dr. McLean's resources in literature and specimens.

This was not a SCAMIT meeting per se, although SCAMIT member participation was prominent. It was more a part of the Invertebrate Identification Workshops that have been run at Scripps by a group of graduate students dealing with taxonomic issues in their thesis projects. Regardless, the ground covered was of interest to SCAMIT members as well. Kelvin represented us and brought and operated the imaging system which allowed us to stay in our seats and watch the problem animals on the screen rather than filing slowly by the eyepieces of a common microscope. Although he digitized a number of species, even more were available on CD-ROM from Ben Pister (including images from Tonya's material).

All the questionable items were rather small, but none were smaller than the dust-sized specimens Tony Phillips had brought of a small, rotund cephalaspid from their sludge-recovery monitoring stations in Santa Monica Bay. This proved, based on morphology of the head and general shell characters, to be a series of very small juveniles of *Parvaplustrum* sp B of SCAMIT. This is one of the many new taxa which Dr. McLean has included in his revision of the West Coast gastropod mollusks. This treatment will be split into two volumes, one from the south (Central Baja to Vancouver Island) and one for the north (Vancouver Island to the Kuriles). Species which occur in the overlap in the Vancouver Island region will be included in both volumes. Dr. McLean made all his specimens available to us for the meeting, as well as all his notebooks of gastropod families and genera, his new species notebooks, and the proof photographs of all the species. He also handed out copies of the photographs for the gastropod section of the new edition of Light's Manual, which he has completed.

After an introduction from Dr. McLean on his project and the nature of the resources available for use during the workshop we began by looking at the images Kelvin had





been creating from vials of problematica provided by the participants. Often these contained multiple unknowns, and provoked a good deal of talk. Kelvin was able to stay ahead of us by digitizing one vial of unknowns while the rest of us tried to identify the last. It seldom became necessary to resort to direct examination of the specimens; the digitized photos usually were clear and detailed enough to allow determination.

Animals examined included several pyramidellids in the genera "*Odostomia*" and "*Turbonilla*", both used in the broad sense (s.l.). In most cases few of our species remain in these genera. Many of the subgenera used by Dall and Bartch in their pyramidellid monograph are now used at generic level, and many other new genera are also in use. There will not be a good source of information on west coast species until Dr. McLean's books are published (date uncertain, but several years at least). Other groups represented were the rissoids (well represented by species of *Barleeia*, *Amphithalamus*, and *Alvania*), rissoellids, cystiscids, retusids, vermetids, epitoniids, vitrinellids, hydrobiids (specifically *Tryonia imitator*), columbellids, muricids, turrids, assimineids, and diaphanids. I'm sure other things slip my mind now...there was more than enough to engage everyone's attention. Even Dr. McLean saw some things that suggested to him not only new species, but new species he didn't yet have in his books. Some specimens stayed with him for further investigation at the end of the day. Altogether a productive day, and a good standard for the next (bivalve) workshop to emulate. It will be held in San Diego on Saturday the 17<sup>th</sup> of January 2004, with Paul Valentich-Scott leading the meeting. All interested parties are urged to participate. Contact Larry Lovell at [llovell@usc.edu](mailto:llovell@usc.edu) for further details and to say you plan to attend.  
Don Cadien (CSDLAC)

## OFF THE DEEP END AGAIN

Well, our B'03 field season is long past and we are now processing the materials collected. In addition to the scheduled benthic collections between 200 and 500m we have been given the opportunity to examine samples taken from down to 900+ meters. This extra set of 30 samples was retained from the stations sampled for chemistry in the 500+ stratum by the CINMS folks, who couldn't see the wisdom in discarding them when they were already on board. BRAVO!! Those of us who have the time (or can make the time) to process will get an additional glimpse of what lives beyond our normal ken and the reach of current POTW monitoring programs. We should all come out well rewarded for the effort that we put into processing. Even those participants who cannot directly examine the samples will have the produced data to help them appreciate the benthic communities in deeper portions of the Bight.

The LACSD sampling grid has contained stations at 305m for many years, and so we have a history of examining upper slope samples. This has helped us to prepare for examination of our deeper samples from B'03. We also performed an exploratory study of the down-slope environment off Palos Verdes this summer. Many of these samples were from deeper than 200m. We have now analyzed these (preliminarily) and the data are available to assist others less familiar with slope environment and communities in preparing to identify their own deeper material.

I have assembled data from a total of 118 samples to produce a list of the species we have encountered since 1998 at depths greater than 200m (included at the end of the newsletter). Bight'98 data are thus not included (we sampled only to 200m in that program). The samples come from depths between 215 and 860m, but over half come from between 290-310 meters on our normal sampling grid. This is not an exhaustive list of animals



reported from these depths (as was the echinoderm list produced earlier) and reflects only the constituents of the 118 considered samples. A depth of occurrence range is provided, also based solely on the 118 samples. Most of the species are already known from shallower or deeper samples, but that data is not included here. Number of samples of occurrence is provided, so the relative frequency with which the taxa were encountered is presented along with the observed bathymetric distribution. In a few cases identifications to genus have been included. It is believed that these probably represent single species, but the species identity is not known. You will not recognize some of these species, which have uncirculated provisional designations. No matter; just realize that they represent something different within the genus at the indicated depths. This is also a first pass, and some of these identifications will undoubtedly be refined and or changed later in the process while the historic data will remain mostly fixed.

Other workers in other areas will find different things, but this list may at least alert you to possible species, which will aid in your identifications. Good hunting to you.  
Don Cadien (CSDLAC)

### **SPECIALIST TAXONOMY**

As we begin processing our B'03 samples we need to remember that some groups will be receiving attention from specialists, and should only be separated - not identified beyond their group identity. The groups selected were the Cnidaria (John Ljubenkov will do them all this time), the Phorona (Eric Hochberg at the SBMNH will examine them as part of a larger examination of the phylum), the Platyhelminthes (Tony Phillips has volunteered to do these for us all), and the class Aplacophora of the phylum Mollusca (Kelvin Barwick and Don Cadien have gotten permission to work together on them from their agencies). In each case specimens of each

group need to be accumulated in a separate vial during processing. Each vial must be labeled with group identity, source sample, collection date, collection depth, processing agency, and a header line identifying that these are B'03 benthic specimens. Standardized label format files have already been distributed to participating laboratories, and these should be used in all cases.

It is recommended that each laboratory keep an accumulation jar for each type of vial, and that vials be placed into these jars immediately after completion of sample sorting. If sorting and identification will take place within a short time of one another (or there is doubt that specialist taxa will be accurately separated during sorting), the separation of the specialist taxonomy groups can be done by the identifying taxonomists rather than the sample sorter. It is important to make these materials available to the specialists as soon as possible, however, so they will have time to perform their examinations and identifications. If we do not distribute the samples for specialist examination until all other data are completed, then we cannot expect to have identifications available for inclusion with other data for analysis.

Counts of specimens going into these vials must be retained by the processing laboratory, as they need to be passed on to the taxonomists identifying the remaining portion of the sample for inclusion on bench sheets. These counts form a place-holder against the later return of information from the specialists. Thus "Phorona 17" may eventually be resolved into counts for three identified species and one unidentified juvenile category. These data modifications are not the responsibility of the processing lab; they are only charged with submitting the appropriate standardized place-holder name and an accurate count in their data submission. Substitution of the specialist derived identifications for the place-holder names will be done following initial data



submissions. Specialty taxa will not be involved in the reidentification QC effort, as the specimens are available to neither Lab A nor Lab B.

Should mis-sorts be found after the initial transport of specialty taxonomy groups to specialists they must be forwarded as rapidly as possible for inclusion in the specialist examination. The specialists should be immediately notified that additional specimens in their group have been found, and the sample (s) and number (s) of specimens involved. Care must also be taken to annotate the bench sheets, indicating that mis-sorts of a specialty group were found, their number, and when they were forwarded to the specialist. If we keep our books straight we will have far fewer data complications to deal with later, and better data as a result. Be as explicit as you can in describing what has taken place regarding specialist taxon distribution, it will avoid unanswerable questions months later when data are being examined.

Transmittal of both the original specialist lots and any subsequent mis-sort derived lots will need to be accompanied by standard chain-of-custody documentation. Prior to shipment the C-of-C should be checked against the bench sheets to confirm that all specialty taxonomy lots separated have been assembled and are being shipped. Whether specialty lots are to be shipped to SCCWRP for central distribution, or are to be dispatched directly from the processing laboratory to the recipient specialist, is not clear from the Laboratory Manual. Please direct questions concerning this issue to SCCWRP prior to any shipments.

### COMMENTS ON NEREIDS by Don Reish, CSULB

In a recent issue of the SCAMIT newsletter, the scientific name of two species of nereid polychaetes were discussed. It was stated that *Nereis grubei* should be referred to as *N. mediator* and *Neanthes arenaceodentata*

should be referred to as *Neanthes acuminata*. I do not agree with either of these suggestions. I will indicate the scientific reasons below for my disagreement.

In a 1954 paper (Reish 1954a) I discussed many different species of the eastern Pacific genus *Nereis*. In writing this paper, which dealt with two species of *Nereis*, I examined many of the types within the genus and indicated which ones I had examined. I concluded that *Nereis mediator* was the same species as the type of *Heteronereis grubei*. The genus *Heteronereis*, described from epitokal (reproductive) stage, is a synonym of *Nereis*. Evidence for my conclusion that *N. mediator* is a synonym of *N. grubei* is: (1) the paragnath number and distribution is identical, especially the arrangement on Area VI, and (2) the occurrence of an epitokal notopodial homogomph falcigerous seta in the prenatatory region in the type material and the material from southern California. I have seen this unique seta, which does not occur in atokal (non-reproductive) specimens, in only one other species. The number of prenatatory segments, a good systematic character for the epitokal stage, was very different in that species. Hartman used my figures of *N. grubei* and cited my 1954 paper but did not use the correct name for this species. *Nereis mediator* is not a valid name for this common nereid in the intertidal region of southern California and should not be used. How did this come about? In the 1954 paper cited above, I also placed two additional species in synonymy: *Nereis pseudoneanthes* Hartman and *Nereis eucapitis* Hartman. The basis for my changes was based on the variability of the paragnath arrangement (fusion, for example) as determined by the laboratory reared specimens. In other words, brothers and/or sisters were described as separate species. Hartman (1959) listed these latter two species as synonymous with *N. mediator*. In other words, she accepted these changes without acknowledging their basis. As I was doing my research in her laboratory, she saw all the type material that I had borrowed,



as well as my laboratory reared specimens. We had many discussions of the project as a whole and of my conclusions. She referred to the worm as *N. mediator* in 1959, while retaining *N. grubei* as a valid taxon. She did not state in either her 1961 or 1968 papers why she still referred to this as *N. mediator*, and ignored the name *N. grubei*. In 1968 she used my figures for *N. grubei* (and cited the source of the figures), but used the name *N. mediator* for this animal. People view her 1968 California errantiate volume as “the bible”, and do not trouble to look at the underlying literature, so this name usage persists. Of course Hartman is no longer with us, but if you still insist on using the invalid name of *N. mediator*, then I urge you to read my 1954 papers (Reish 1954a, 1954b

The issue of *Neanthes arenaceodentata* vs *Neanthes acuminata* is much more complex. *Neanthes caudata*, which may be referred to as *Nereis caudata* or *Nereis (Neanthes) caudata*, from Europe, is a homonym of a spionid, and Pettibone (1963) renamed the worm, based on material from New England, *Neanthes arenaceodentata*. Later Day (1973) came across this worm in North Carolina and renamed it *N. acuminata* because it was an earlier available name. Europeans still refer to this worm as *N. caudata*. Weinberg, et al. (1990) studied the chromosome number of different populations. *N. acuminata* from New England had  $2N=22$ ; *N. arenaceodentata* from my lab population (originally from Los Angeles Harbor in 1964) had  $2N=18$ ; collections from the mouth of San Gabriel River and Upper Newport Bay also had  $2N=18$  but the centromere was in a different location on one chromosome; Hawaiian population had  $2N=28$ . As expected the New England population and my lab population did not reproduce. Joerg Hardege (UK) and I are working on DNA comparisons of different populations of this complex. The New England and my lab populations are very far apart. On basis of these findings the southern California population should not be referred to as *N.*

*acuminata*. What, then, is the correct name for the southern California population? There is no correct name. Should it be described as a new species? Probably; but will it? Hard to say. What about the Hawaiian population and *N. cricognatha* from India? I also collected it from the Marshall Islands in 1957. Worms from these different populations look alike morphologically. At this time I would call the local population *Neanthes arenaceodentata*, in quotes, if you wish. The name *Neanthes arenaceodentata* is widely used in the literature (i.e. US Army Corps of Engineers toxicological manual, Standard Methods, ASTM manuals). The name *Neanthes acuminata* should not be used for Pacific Ocean populations. I now have reproducing populations from sources in Newport Bay, the San Gabriel River, and Connecticut, as well as my original culture. The worms from Connecticut are much smaller, and their eggs are pale yellow in color compared to hen's egg-yolk color in other populations. Yellow tissue surrounds the gut in the Connecticut form, but not in any of the California sourced populations. The nature of this tissue is unknown.

#### PUBLICATION AVAILABLE

Dr. Michel Hendrickx has notified us that the following publication is available on-line for interested parties: **Hendrickx, M.E. & J. Salgado Barragan. 1991.** Los Estomatopodos del Pacifico Mexicano. Inst. Cienc. del Mar y Limnologia, UNAM, Publ. Esp. 10:1-200. It is available at:

<http://biblioweb.dgsca.unam.mx/cienciasdelmar/especiales/1991-10/articulo463.html>





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Please visit the SCAMIT Website at: <http://www.scamit.org>

#### SCAMIT OFFICERS:

If you need any other information concerning SCAMIT please feel free to contact any of the officers at their e-mail addresses:

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Volumes 1 - 4 (compilation).....	\$ 30.00
Volumes 5 - 7 (compilation).....	\$ 15.00
Volumes 8 - 15 .....	\$ 20.00/vol.

Single back issues are also available at cost.

The SCAMIT newsletter is published monthly and is distributed freely through the web site at [www.scamit.org](http://www.scamit.org). Membership is \$15 for the electronic copy available via the web site and \$30 to receive a printed copy via USPS. Institutional membership, which includes a mailed printed copy, is \$60. All new members receive a printed copy of the most current edition of "A Taxonomic Listing of Soft Bottom Macro- and Megainvertebrates ... in the Southern California Bight." The current edition, the fourth, contains 2,067 species with partial synonyms. All correspondences can be sent to the Secretary at the email address above or to:

SCAMIT

C/O The Natural History Museum, Invertebrate Zoology

attn: Leslie Harris

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Infauna recorded from samples taken deeper than 200m by LACSD

Records include 305m monitoring stations on 11 transects from summer surveys between 1998 and 2003 (66 samples); 42 samples between 215 and 860 m off Palos Verdes and the San Pedro Sea Shelf taken in a summer 2003 special slope/basin study; 7 samples from 506-643m from our screen size test; and 3 samples from the B'03 deep group which have been processed by LACSD.

Information from analysis of 118 samples was used to generate the bathymetric

distributions included below, but over half came from around 300m

PLEASE NOTE: nearly all species occur outside the bathymetric range seen in present data

This range only reflects that observed in the 118 considered samples.

Phylum	Class	Family	Species	N (occ)	Z (m)
Annelida	Polychaeta				
		Acoetidae	Polyodontes panamensis	1	600
		Ampharetidae	Ampharete acutifrons	2	296-830
			Amphicteis scaphobranchiata	3	253-660
			Eclysippe trilobata	24	305-860
			Glyphanostomum pallescens	7	600-830
			Lysippe sp A	2	660-826
			Lysippe sp B	2	576-643
			Melinna heterodonta	27	294-643
			Melinna oculata	1	840
			Mooresamytha bioculata	5	253-826
			Mugga wahrbergi	1	643
			Paralysippe annectens	23	542-860
			Samytha californiensis	3	295-797
			Ampharetidae sp SD1	1	643
		Amphinomidae	Chloeia pinnata	33	253-466
			Pareurythoe californica	1	353
		Aphroditidae	Aphrodita japonica	1	297
		Capitellidae	Anotomastus gordioides	1	502
			Capitella capitata CMLPX	2	298-337
			Decamastus gracilis	19	253-321
			Dodecamastus mariaensis	19	502-800
			Heteromastus filobranchnus	15	290-660
			Mediomastus ambiseta	1	506
			Notomastus magnus	3	294-660
			Notomastus sp A	36	352-380
			Notomastus sp base 1	1	553
		Chaetopteridae	Phyllochaetopterus limicolus	27	253-860
			Spiochaetopterus costarum	8	298-860
			Aphelochaeta glandaria		
		Cirratulidae	CMLPX	37	253-830
			Aphelochaeta monilaris	45	253-404
			Aphelochaeta williamsi	2	353-506
			Aphelochaeta sp base 1	1	826

	Chaetozone hartmanae	2	305-321
	Chaetozone setosa CMLPX	5	294-306
	Monticellina cryptica	3	253-813
	Monticellina tessellata	16	295-857
	Protocirrinieris sp B	1	825
Cossuridae	Cossura candida	2	300-506
	Cossura pygodactylata	1	643
	Cossura sp. A	6	292-643
	Dorvillea (Schistomeringos)		
Dorvilleidae	longicornis	5	294-305
Eunicidae	Eunice americana	2	294-300
	Marphysa sp A	1	253
Flabelligeridae	Brada villosa	12	434-643
	Pherusa neopapillata	3	305-506
Glyceridae	Glycera americana	6	290-310
	Glycera branchiopoda	4	713-830
	Glycera nana	26	253-506
	Glycera tessellata	1	297
Goniadidae	Glycinde armigera	38	290-840
	Goniada annulata	1	466
	Goniada brunnea	7	290-380
	Goniada maculata	3	290-300
Hesionidae	Gyptis sp alpha	1	506
	Podarkeopsis glabrus	3	298-305
Lumbrineridae	Errano lagunae	4	294-353
	Lumbrineris californiensis	1	305
	Lumbrineris cruzensis	24	290-434
	Lumbrineris index	5	292-506
	Lumbrineris japonica	2	298-380
	Lumbrineris latreilli	1	305
	Ninoe tridentata	2	294-297
	Scoletoma sp A	1	253
	Scoletoma tetraura CMLPX	3	295
Maldanidae	Euclymeninae sp A	3	294-680
	Maldane californiensis	3	553-643
	Maldane sarsi	39	253-580
Nereididae	Gymnonereis crosslandi	2	253-580
	Nereis procera	4	292-305
Nephtyidae	Aglaophamus erectens	14	253-310
	Nephtys caecoides	2	300-600
	Nephtys cornuta	43	253-830
	Nephtys ferruginea	14	294-305
Onuphidae	Diopatra ornata	1	300
	Diopatra tridentata	1	305
	Onuphis iridescens	34	253-434
	Onuphis sp 1	1	292
	Paradiopatra parva	8	295-310
	Praxillella pacifica	1	294
Opheliidae	Ophelina acuminata	1	553
Orbiniidae	Califia calida	1	680
	Leitoscoloplos pugettensis	15	290-404



Oweniidae	Galathowenia oculata	1	680
	Myriochele gracilis	4	321-643
	Myriochele olgae	3	294-643
Paraonidae	Aricidea (Acmira) catherinae	2	295-298
	Aricidea (Acmira) horikoshii	1	840
	Aricidea (Acmira) lopezi	4	294-660
	Aricidea (Acmira) rubra	1	860
	Aricidea (Acmira) simplex	3	797-830
	Aricidea (Allia) antennata	3	295-300
	Aricidea (Allia) hartleyi	1	300
	Aricidea (Allia) sp A	1	253
	Aricidea (Allia) sp beta	1	643
	Levinsenia gracilis	5	253-305
	Levinsenia multibranchiata	3	295-305
Pectinariidae	Pectinaria californiensis	50	290-502
Phyllodocidae	Eulalia californiensis	1	295
	Eulalia levicornuta	3	294-305
	Nereiphyllia castanea	1	295
	Paranaitis polynoides	1	295
	Phyllodoce cuspidata	1	310
	Phyllodoce groenlandica	9	253-380
	Phyllodoce hartmanae	5	295-434
	Sige sp A	13	294-337
Pilargidae	Ancistrosyllis groenlandica	24	294-580
	Sigambra tentaculata	5	506-643
Polynoidae	Eucranta anoculata	1	713
	Harmothoe fragilis	1	826
	Hesperonoe laevis	2	295-797
	Lepidasthenia longicirrata	1	380
	Malmgreniella baschi	3	253-466
	Malmgreniella sanpedroensis	7	290-305
	Malmgreniella scriptoria	5	292-306
	Malmgreniella sp.	2	506-511
	Malmgreniella sp A	1	295
	Subadyte mexicana	12	290-656
	Subadyte sp base 1	1	404
Sabellidae	Chone sp base 1	1	380
	Chone sp C	1	502
	Fabrisabella sp A	2	294-576
	Potamethus sp A	1	600
Serpulidae	Protula superba	1	826
Spionidae	Dipolydora socialis	2	253-305
	Laonice cirrata	17	290-830
	Laonice nuchalis	6	290-797
	Malacoceros indicus	1	294
	Microspio pigmentata	1	292
	Paraprionospio pinnata	61	290-576
	Prionospio (Minuspio) lighti	8	292-306
	Prionospio (Prionospio) dubia	1	253
	Prionospio (Prionospio) ehlersi	19	292-580

		Prionospio ( <i>Prionospio</i> ) <i>jubata</i>	2	294-305
		<i>Spiophanes berkeleyorum</i>	17	290-404
		<i>Spiophanes bombyx</i>	1	253
		<i>Spiophanes duplex</i>	3	253-353
		<i>Spiophanes fimbriata</i>	17	253-860
		<i>Spiophanes wigleyi</i>	5	800-860
	Syllidae	<i>Syllis (Ehlersia) heterochaeta</i>	3	301-305
		<i>Syllis (Ehlersia) hyperioni</i>	1	253
	Terebellidae	<i>Lanassa gracilis</i>	3	600-703
		<i>Phisidia sanctamariae</i>	2	600-660
		<i>Phisidia</i> sp base 1	4	543-660
		<i>Pista agassizi</i>	2	297-305
		<i>Pista estevanica</i>	1	353
		<i>Pista wui</i>	45	290-840
		<i>Polycirrus californicus</i>	1	253
		<i>Polycirrus</i> sp A	2	300-353
		<i>Proclea</i> sp A	1	580
		<i>Streblosoma</i> sp B	1	305
	Trichobranchidae	<i>Artacama coniferi</i>	1	600
		<i>Artacamella hancocki</i>	1	580
		<i>Terebellides californica</i>	5	580-840
		<i>Terebellides reishi</i>	2	294-660
Cnidaria				
	Campanulinidae	<i>Oplorhiza polynema</i>	1	660
	Corymorphidae	<i>Euphysa</i> sp A	1	353
	Edwardsiidae	<i>Metedwardsia</i> sp A	3	840-857
		<i>Scolanthus</i> sp A	1	337
	Pennatulidae	<i>Pennatula californica</i>	1	703
	Stachyptilidae	<i>Stachyptilum superbum</i>	3	542-826
	Virgulariidae	<i>Virgularia agassizii</i>	1	749
Platyhelminthes				
	Polycladida			
	Leptoplanidae	<i>Parviplana californica</i>	1	326
Echiura				
	Echiurida			
	Thalassematidae	<i>Arhynchite californicus</i>	13	295-800
	Thalassematidae	<i>Listriolobus pelodes</i>	3	294-305
Mollusca				
	Bivalvia			
	Carditidae	<i>Cyclocardia ventricosa</i>	12	295-580
	Corbulidae	<i>Caryocorbula porcella</i>	1	443
	Cuspidariidae	<i>Cardiomya planetica</i>	1	295
		<i>Cuspidaria parapodema</i>	1	305
		<i>Luzonia walleri</i>	7	480-749
	Galeommatidae	<i>Divariscintilla</i> sp A	1	506
	Hiatellidae	<i>Saxicavella pacifica</i>	12	295-580
	Lucinidae	<i>Lucinoma annulatum</i>	3	294-790
		<i>Parvilucina tenuisculpta</i>	48	215-643
	Malletiidae	<i>Malletia pacifica</i>	4	326-486
	Montacutidae	<i>Rochefortia compressa</i>	9	295-660

		<i>Rochefortia mortoni</i>	1	300
		<i>Rochefortia tumida</i>	8	295-800
	Mytilidae	<i>Dacrydium pacificum</i>	6	502-840
	Neilonellidae	<i>Neilonella ritteri</i>	11	486-643
	Nuculanidae	<i>Nuculana conceptionis</i>	18	215-576
		<i>Nuculana penderi</i>	1	380
		<i>Nuculana taphria</i>	1	298
	Nuculidae	<i>Ennucula tenuis</i>	2	326-327
	Pectinidae	<i>Delectopecten vancouverensis</i>	6	294-857
	Tellinidae	<i>Macoma carlottensis</i>	31	215-466
		<i>Tellina cadieni</i>	7	294-305
		<i>Tellina carpenteri</i>	11	215-305
		<i>Tellina modesta</i>	1	299
		<i>Tellina sp B</i>	14	215-353
	Thyasiridae	<i>Adontorhina cyclia</i>	10	253-848
		<i>Axinodon redondoensis</i>	9	542-830
		<i>Axinopsida serricata</i>	25	215-443
		<i>Thyasira flexuosa</i>	4	253-502
	Verticordiidae	<i>Dallicordia alaskana</i>	1	576
	Vesicomidae	<i>Vesicomya elongata</i>	1	790
		<i>Vesicomya lepta</i>	2	703-790
Gastropoda				
	Acteonidae	<i>Rictaxis painei</i>	1	327
		<i>Rictaxis punctocaelatus</i>	2	215-290
	Aglajidae	<i>Aglaja ocelligera</i>	2	302-305
	Aplustridae	<i>Parvaplustrum sp A</i>	1	215
		<i>Parvaplustrum sp B</i>	1	304
	Cancellariidae	<i>Cancellaria crawfordiana</i>	2	292-295
	Cerithiidae	<i>Lirobittium rugatum</i>	13	294-502
	Columbellidae	<i>Amphissa bicolor</i>	7	215-443
		<i>Amphissa undata</i>	3	295-300
		<i>Astyris permodesta</i>	23	300-857
	Cylichnidae	<i>Acteocina culcitella</i>	1	300
		<i>Acteocina eximia</i>	2	337-404
		<i>Cylichna diegensis</i>	3	295-353
	Drillidae	<i>Suavodrillia kennecottii</i>	1	353
	Diaphanidae	<i>Diaphana californica</i>	3	295-353
	Eulimidae	<i>Balcis sp A</i>	1	327
		<i>Balcis oldroydae</i>	3	215-326
		<i>Eulima raymondi</i>	1	215
	Gastropteridae	<i>Gastropteron pacificum</i>	16	292-680
	Philinidae	<i>Philine auriformis</i>	9	290-305
		<i>Philine sp A</i>	1	292
	Retusidae	<i>Volvulella californica</i>	2	309-553
	Ringiculidae	<i>Microglyphis brevicula</i>	5	290-713
	Rissoidae	<i>Alvania rosana</i>	6	486-643
	Turridae	<i>Antiplanes catalinae</i>	1	301
		<i>Megasurcula carpenteriana</i>	1	215
	unknown	<i>Bullomorpha sp A</i>	1	790
Scaphopoda				

	Gadilidae	Polyschides californicus	3	327-378
		Polyschides tolmiei	40	215-860
	Dentaliidae	Dentalium vallicolens	2	305-310
	Laevidentaliidae	Rhabdus rectius	16	215-826
Aplacophora	Chaetodermatidae	Chaetoderma elegans	1	680
		Chaetoderma hancocki	5	553-830
		Chaetoderma pacificum	3	295-305
		Falcidens hartmanae	13	309-703
		Falcidens longus	6	292-321
		Falcidens macracanthos	10	292-506
		Furcillidens sp A	1	749
	Limifossoridae	Limifossor fratula	44	215-660
	Prochaetodermatidae	Spathoderma californica	5	580-660
		Chevroderma sp. A	2	643
Nemertea	Anopla			
	Carinomidae	Carinoma mutabilis	1	294
	Lineidae	Cerebratulus californiensis	22	294-830
		Lineus bilineatus	3	296-380
		Micrura sp	28	290-813
		Micrura wilsoni	1	800
	Tubulanidae	Tubulanus nothus	2	294-797
		Tubulanus polymorphus	9	297-857
	unknown	Palaeonemertea sp D	13	294-860
	Valenciniidae	Zygeupolia rubens	1	294
	Enopla			
	Amphiporidae	Amphiporus cruentatus	1	857
	Emplectonematidae	Paranemertes californica	1	353
	Prosorhochmidae	Prosorhochmus albidus	1	295
	Tetrastemmatidae	Tetrastemma candidum	1	298
Arthropoda	Ostracoda			
	Cylindroleberididae	Bathyleberis sp	2	543-703
	Philomedidae	Euphilomedes carcharodonta	1	290
		Euphilomedes producta	13	292-576
		Scleroconcha trituberculata	2	292-353
	Mysidacea			
	Mysidae	Boreomysis californica	1	643
		Holmesiella anomala	3	305-310
		Mysidella americana	2	327-378
		Pseudomma sp.	15	215-486
	Cumacea			
	Diastylidae	Diastylis pellucida	29	290-502
		Diastylis sentosa	1	353
		Diastylis sp C	1	576
		Leptostylis calva	2	580-600
	Lampropidae	Hemilamprops sp A	4	576-703



	Leuconidae	Eudorella pacifica	6	253-506
		Leucon declivis	7	466-840
	Nannastacidae	Campylaspis blakei	1	297
		Campylaspis canaliculata	5	553-713
		Campylaspis sp A	3	295-703
		Procampylaspis coenosa	2	309-327
	Tanaidacea			
	Anarthruridae	Araphura cuspirostris	1	309
		Tanaella propinquus	2	309-353
	Apseudidae	Carpoapseudes caraspinosus	2	506-580
	Leptocheliidae	Leptochelia dubia	1	680
	Tanaidae	Zeuxo maledivensis	1	305
	Isopoda			
	Anthuridae	Haliophasma geminatum	3	297-353
	Eurycopidae	Eurycope californiensis	5	502-703
	Gnathiidae	Caecognathia crenulatiforns	5	215-309
	Idoteidae	Synidotea calcarea	1	353
	Munnopsidae	Belonectes sp A	3	280-502
		Ilyarachna acarina	1	309
		Munnopsurus sp A	5	309-600
	Amphipoda			
	Aeginellidae	n.gen. n.sp.	7	302-797
	Ampeliscidae	Ampelisca plumosa	8	553-860
		Ampelisca unsocalae	44	253-680
	Eusiridae	Rhachotropis barnardi	7	253-378
		Rhachotropis distincta	1	306
		Rhachotropis luculenta	4	294-337
	Isaeidae	Protomedeia prudens	2	295-296
	Ischyroceridae	Erichthonius rubricornis	2	294-295
	Liljeborgiidae	Listriella albina	13	294-830
	Lysianassidae	Aruga oculata	1	294
		Lepidepecreum n. sp	1	643
		Orchomene pacifica	1	580
		Pachynus barnardi	1	295
	Oedicerotidae	Americhelidium sp	2	296-480
		Bathymedon kassites	1	294
		Bathymedon pumilus	8	294-542
		Bathymedon roquedo	4	280-309
		Bathymedon vulpeculus	6	305-434
		Deflexilodes norvegicus	2	300-321
		Monoculodes emarginatus	3	253-305
		Monoculodes latissimanus	13	253-378
		Pacifoculodes barnardi	5	253-353
	Pardaliscidae	Nicippe tumida	10	294-576
	Phoxocephalidae	Harpiniopsis epistomatus	3	353-580
		Harpiniopsis fulgens	6	215-327
		Harpiniopsis niadis	1	643
		Heterophoxus affinis	1	303
		Heterophoxus ellisi	17	215-486
		Heterophoxus oculatus	1	298

		Paraphoxus sp 1 of Barnard	3	292-434
		Rhepoxynius abronius	1	680
	Podoceridae	Dulichia remis	1	576
	Synopiidae	Syrrhoe longifrons	3	253-326
Decapoda				
	Axiidae	Calocarides quinqueseriatus	3	296-486
	Crangonidae	Neocrangon communis	1	215
	Ctenochelidae	Callianopsis goniophthalma	2	656-800
	Hippolytidae	Spirontocaris sica	6	309-825
	Paguridae	Phimochirus californiensis	1	296
	Pinnotheridae	Pinnixa occidentalis	3	294-576
		Pinnixa scamit	2	296-380
Echinodermata				
	Echinoidea			
	Amphiuridae	Amphiodia digitata	1	300
		Amphiodia urtica	3	294-300
		Amphioplus strongyloplax	1	295
		Amphiura arcystata	2	294-305
		Dougaloplus amphacanthus	5	290-305
	Asteronychidae	Asteronyx longifissus	1	656
	Brissidae	Brissopsis pacifica	8	215-580
	Chiridotidae	Chiridota sp	2	294-302
	Molpadiidae	Molpadia intermedia	1	300
	Ophiuridae	Ophiospalma jolliensis	1	656
	Phyllophoridae	Pentamera pseudocalcigera	5	292-380
	Schizasteridae	Brisaster latifrons	18	215-580
	Strongylocentrotidae	Alloctrotus fragilis	16	280-434
	Toxopneustidae	Lytechinus pictus	3	294-305
Chordata				
	Hemichordata			
	Harrimaniidae	Saccoglossus sp.	2	656-703
		Stereobalanus sp.	17	600-860

331 taxa