Module 4:
Sharing: Making Library, Archive & Museum Collections FAIR

Case study: collections-as-[FAIR]-data in a marine science library

Amanda Whitmire

Stanford University Libraries

thalassa@stanford.edu

Digital Collection Curator Training Pilot
24th September 2024

Supporting

Co-funded by the European Union

UK Research and Innovation

Why collections-as-data?

"Assessments of ecological change and determination of its drivers are hampered by a **lack of adequate data**, even in intensively studied regions. … This problem is especially severe in the marine environment, where continued observation is often logistically difficult."

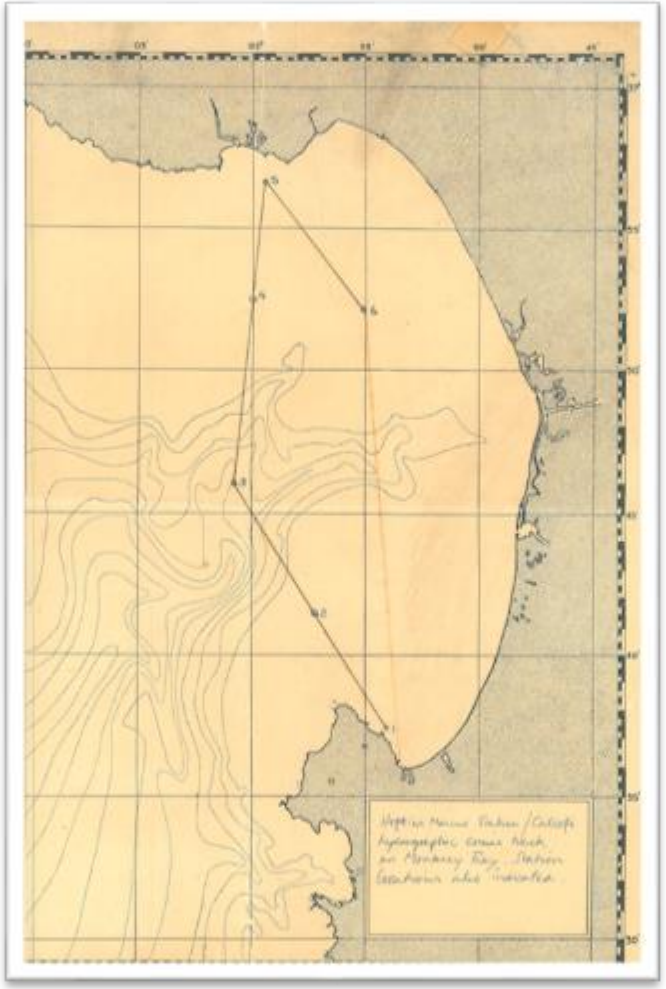
Micheli, Fiorenza, James Carlton, John Pearse, Jennifer Selgrath, Robin Elahi, James Watanabe, Megan Mach, et al. "Field Stations as Sentinels of Change." Frontiers in Ecology and the Environment 18, no. 6 (2020): 320–22.

Watercolor paintings of oceanographic data from Monterey Bay, CA, USA 1951-1954.

Example 1: oceanographic data

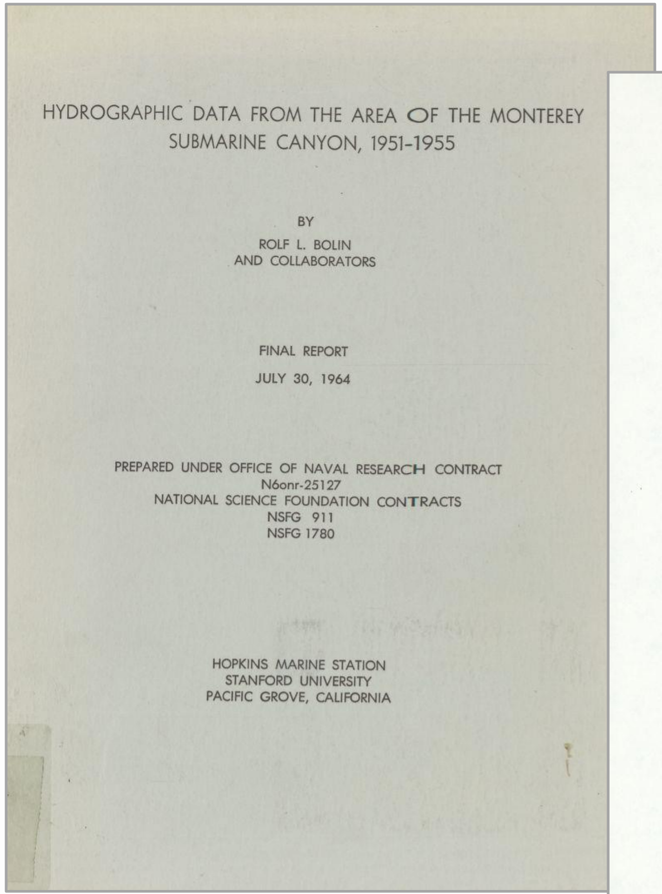
https://purl.stanford.edu/tv596pc9500
https://purl.stanford.edu/hf264wx4780

CalCOFI Stations
Monterey Bay, CA, USA



Hopkins Marine Station
Pacific Grove, CA USA

Hydrographic data from the area of the Monterey submarine canyon, 1951-1955


HYDROGRAPHIC DATA FROM THE AREA OF THE MONTEREY SUBMARINE CANYON, 1951-1955

BY

ROLF L. BOLIN
AND COLLABORATORS

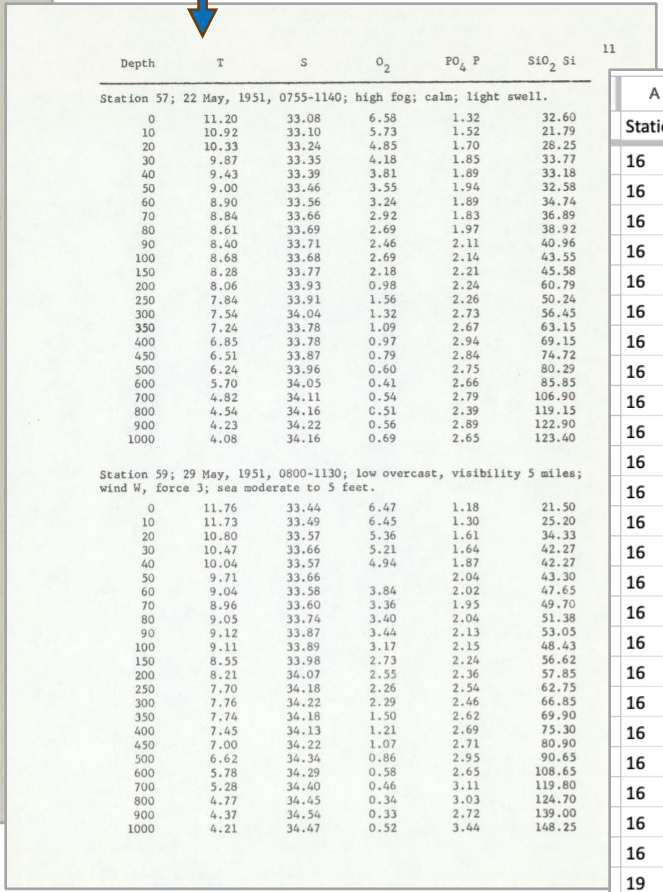
FINAL REPORT

JULY 30, 1964

PREPARED UNDER OFFICE OF NAVAL RESEARCH CONTRACT
N6onr-25127
NATIONAL SCIENCE FOUNDATION CONTRACTS
NSFG 911
NSFG 1780

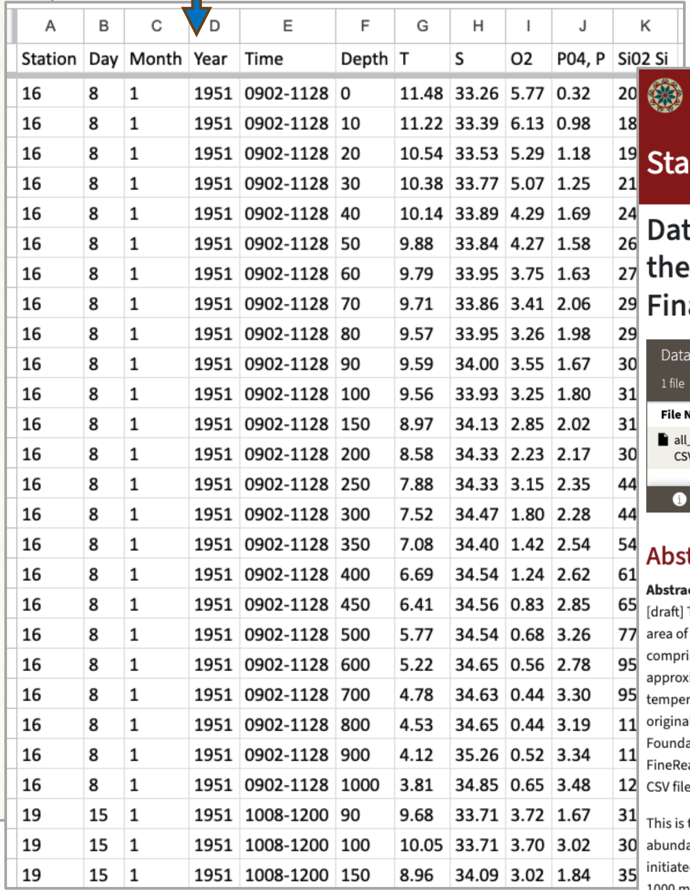
HOPKINS MARINE STATION
STANFORD UNIVERSITY
PACIFIC GROVE, CALIFORNIA

Physical report


11

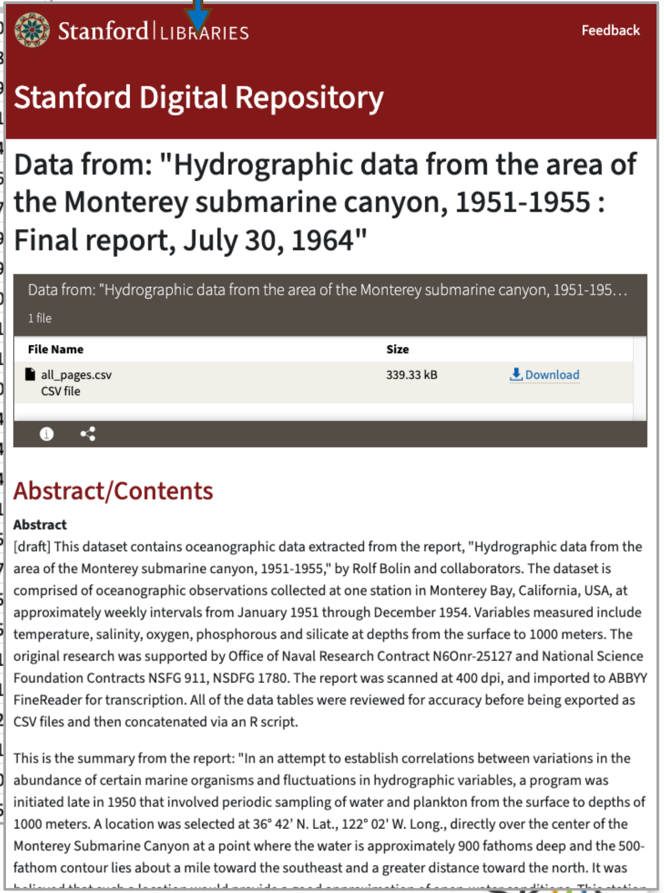
Depth	T	S	O_2	PO_4 P	SiO_2 Si
Station 57; 22 May, 1951, 0755-1140; high fog; calm; light swell.					
0	11.20	33.08	6.58	1.32	32.60
10	10.92	33.10	5.73	1.52	21.79
20	10.33	33.24	4.85	1.70	28.25
30	9.87	33.35	4.18	1.85	33.77
40	9.43	33.39	3.81	1.89	33.18
50	9.00	33.46	3.55	1.94	32.58
60	8.90	33.56	3.24	1.89	34.74
70	8.84	33.66	2.92	1.83	36.89
80	8.61	33.69	2.69	1.97	38.92
90	8.40	33.71	2.46	2.11	40.96
100	8.68	33.68	2.69	2.14	43.55
150	8.28	33.77	2.18	2.21	45.58
200	8.06	33.93	0.98	2.24	60.79
250	7.84	33.91	1.56	2.26	50.24
300	7.54	34.04	1.32	2.73	56.45
350	7.24	33.78	1.09	2.67	63.15
400	6.85	33.78	0.97	2.94	69.15
450	6.51	33.87	0.79	2.84	74.72
500	6.24	33.96	0.60	2.75	80.29
600	5.70	34.05	0.41	2.66	85.85
700	4.82	34.11	0.54	2.79	106.90
800	4.54	34.16	0.51	2.39	119.15
900	4.23	34.22	0.56	2.89	122.90
1000	4.08	34.16	0.69	2.65	123.40
Station 59; 29 May, 1951, 0800-1130; low overcast, visibility 5 miles; wind W, force 3; sea moderate to 5 feet.					
0	11.76	33.44	6.47	1.18	21.50
10	11.73	33.49	6.45	1.30	25.20
20	10.80	33.57	5.36	1.61	34.33
30	10.47	33.66	5.21	1.64	42.27
40	10.04	33.57	4.94	1.87	42.27
50	9.71	33.66		2.04	43.30
60	9.04	33.58	3.84	2.02	47.65
70	8.96	33.60	3.36	1.95	49.70
80	9.05	33.74	3.40	2.04	51.38
90	9.12	33.87	3.44	2.13	53.05
100	9.11	33.89	3.17	2.15	48.43
150	8.55	33.98	2.73	2.24	56.62
200	8.21	34.07	2.55	2.36	57.85
250	7.70	34.18	2.26	2.54	62.75
300	7.76	34.22	2.29	2.46	66.85
350	7.74	34.18	1.50	2.62	69.90
400	7.45	34.13	1.21	2.69	75.30
450	7.00	34.22	1.07	2.71	80.90
500	6.62	34.34	0.86	2.95	90.65
600	5.78	34.29	0.58	2.65	108.65
700	5.28	34.40	0.46	3.11	119.80
800	4.77	34.45	0.34	3.03	124.70
900	4.37	34.54	0.33	2.72	139.00
1000	4.21	34.47	0.52	3.44	148.25

Scanned report


A	B	C	D	E	F	G	H	I	J	K
Station	Day	Month	Year	Time	Depth	T	S	O2	P04, P	Si02 Si
16	8	1	1951	0902-1128	0	11.48	33.26	5.77	0.32	20
16	8	1	1951	0902-1128	10	11.22	33.39	6.13	0.98	18
16	8	1	1951	0902-1128	20	10.54	33.53	5.29	1.18	19
16	8	1	1951	0902-1128	30	10.38	33.77	5.07	1.25	21
16	8	1	1951	0902-1128	40	10.14	33.89	4.29	1.69	24
16	8	1	1951	0902-1128	50	9.88	33.84	4.27	1.58	26
16	8	1	1951	0902-1128	60	9.79	33.95	3.75	1.63	27
16	8	1	1951	0902-1128	70	9.71	33.86	3.41	2.06	29
16	8	1	1951	0902-1128	80	9.57	33.95	3.26	1.98	29
16	8	1	1951	0902-1128	90	9.59	34.00	3.55	1.67	30
16	8	1	1951	0902-1128	100	9.56	33.93	3.25	1.80	31
16	8	1	1951	0902-1128	150	8.97	34.13	2.85	2.02	31
16	8	1	1951	0902-1128	200	8.58	34.33	2.23	2.17	30
16	8	1	1951	0902-1128	250	7.88	34.33	3.15	2.35	44
16	8	1	1951	0902-1128	300	7.52	34.47	1.80	2.28	44
16	8	1	1951	0902-1128	350	7.08	34.40	1.42	2.54	54
16	8	1	1951	0902-1128	400	6.69	34.54	1.24	2.62	61
16	8	1	1951	0902-1128	450	6.41	34.56	0.83	2.85	65
16	8	1	1951	0902-1128	500	5.77	34.54	0.68	3.26	77
16	8	1	1951	0902-1128	600	5.22	34.65	0.56	2.78	95
16	8	1	1951	0902-1128	700	4.78	34.63	0.44	3.30	95
16	8	1	1951	0902-1128	800	4.53	34.65	0.44	3.19	11
16	8	1	1951	0902-1128	900	4.12	35.26	0.52	3.34	11
16	8	1	1951	0902-1128	1000	3.81	34.85	0.65	3.48	12
19	15	1	1951	1008-1200	90	9.68	33.71	3.72	1.67	31
19	15	1	1951	1008-1200	100	10.05	33.71	3.70	3.02	30
19	15	1	1951	1008-1200	150	8.96	34.09	3.02	1.84	35

Transcribed data

Data shared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Feedback

Stanford Digital Repository

Data from: "Hydrographic data from the area of the Monterey submarine canyon, 1951-1955 : Final report, July 30, 1964"

Data from: "Hydrographic data from the area of the Monterey submarine canyon, 1951-195…

1 file

File Name	Size	
all_pages.csv CSV file	339.33 kB	Download

Abstract/Contents

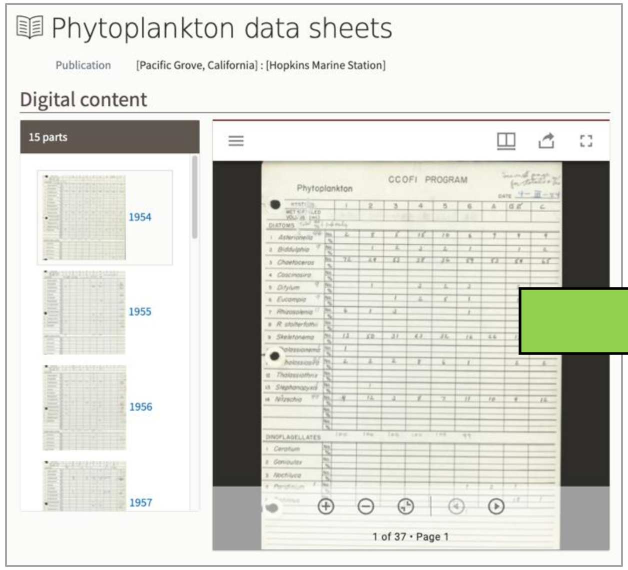
Abstract

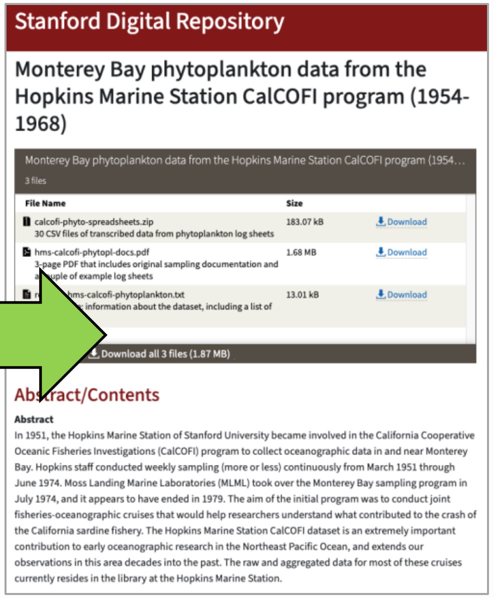
[draft] This dataset contains oceanographic data extracted from the report, "Hydrographic data from the area of the Monterey submarine canyon, 1951-1955," by Rolf Bolin and collaborators. The dataset is comprised of oceanographic observations collected at one station in Monterey Bay, California, USA, at approximately weekly intervals from January 1951 through December 1954. Variables measured include temperature, salinity, oxygen, phosphorous and silicate at depths from the surface to 1000 meters. The original research was supported by Office of Naval Research Contract N6Onr-25127 and National Science Foundation Contracts NSFG 911, NSDFG 1780. The report was scanned at 400 dpi, and imported to ABBYY FineReader for transcription. All of the data tables were reviewed for accuracy before being exported as CSV files and then concatenated via an R script.

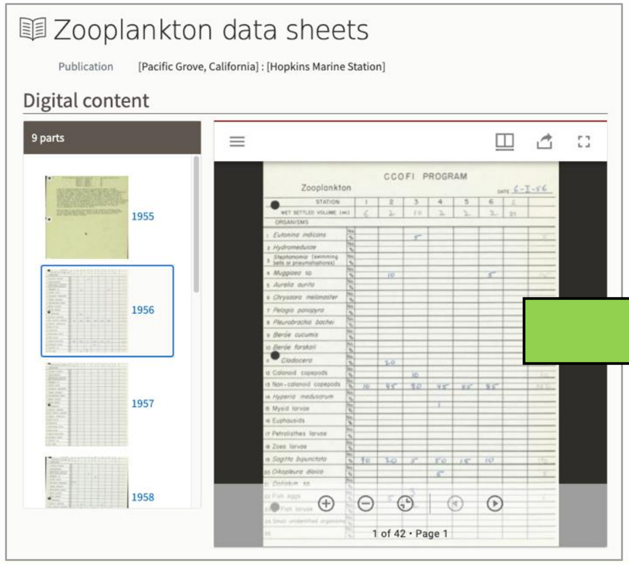
This is the summary from the report: "In an attempt to establish correlations between variations in the abundance of certain marine organisms and fluctuations in hydrographic variables, a program was initiated late in 1950 that involved periodic sampling of water and plankton from the surface to depths of 1000 meters. A location was selected at 36° 42' N. Lat., 122° 02' W. Long., directly over the center of the Monterey Submarine Canyon at a point where the water is approximately 900 fathoms deep and the 500-fathom contour lies about a mile toward the southeast and a greater distance toward the north. It was

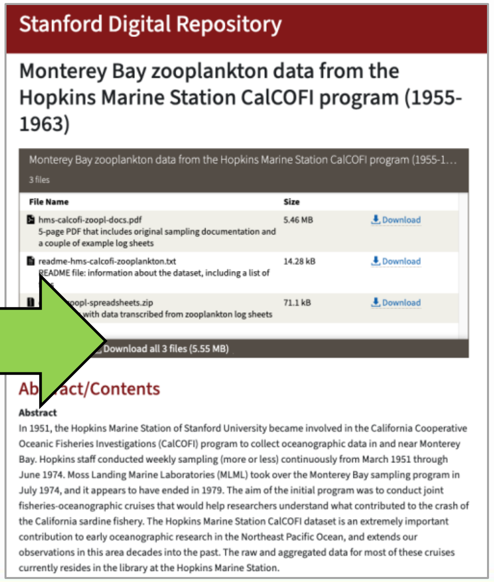
Report: https://searchworks.stanford.edu/view/2229625 | Data: https://purl.stanford.edu/gb878nx4650

There's more CalCOFI data …

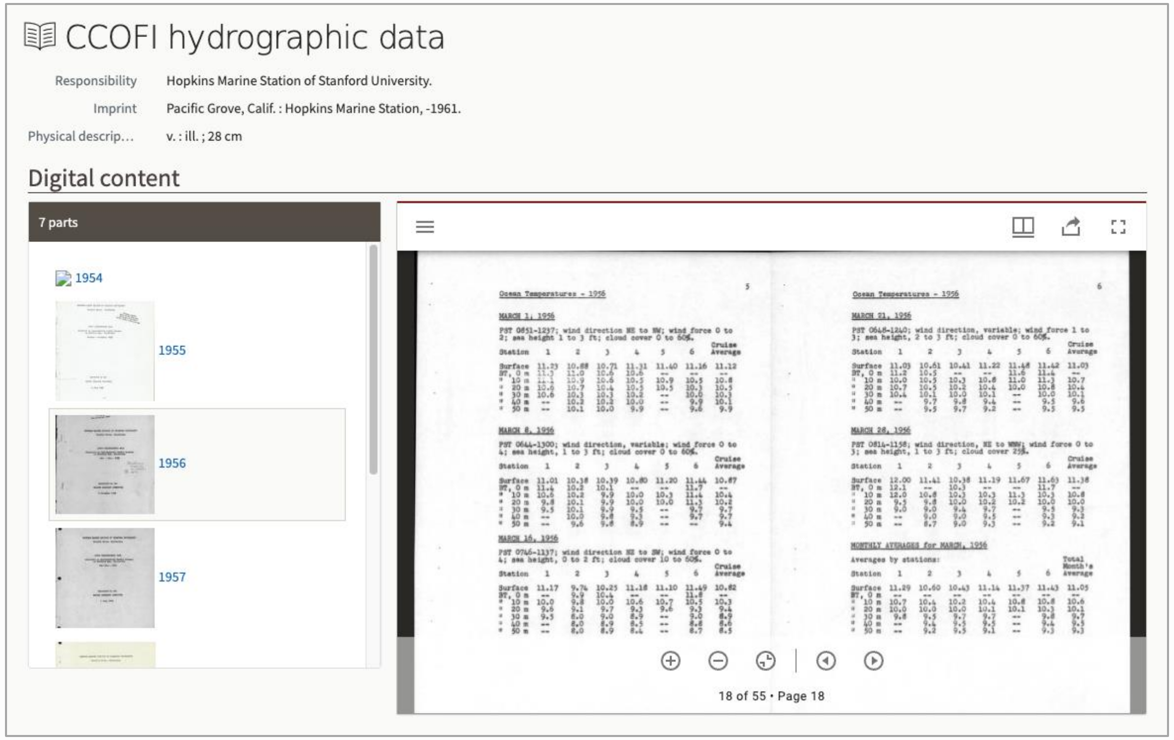








Annual data reports, 1954 – 1978: all transcribed (need to be accessioned to the repository)



1954-1960: https://searchworks.stanford.edu/view/12065912
1961-1974: https://searchworks.stanford.edu/view/397419
1974-1978: https://searchworks.stanford.edu/view/496786

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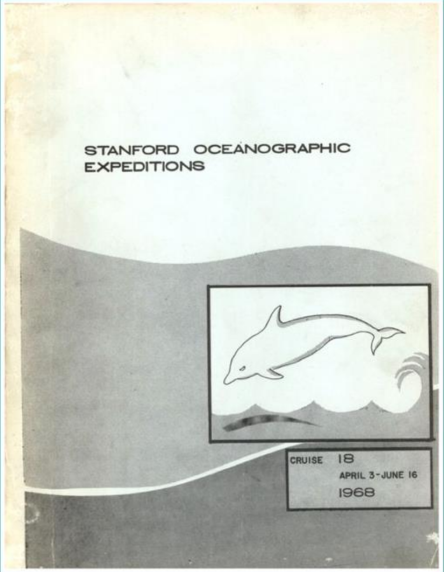
Stanford Oceanographic Expeditions

Cruise Reports



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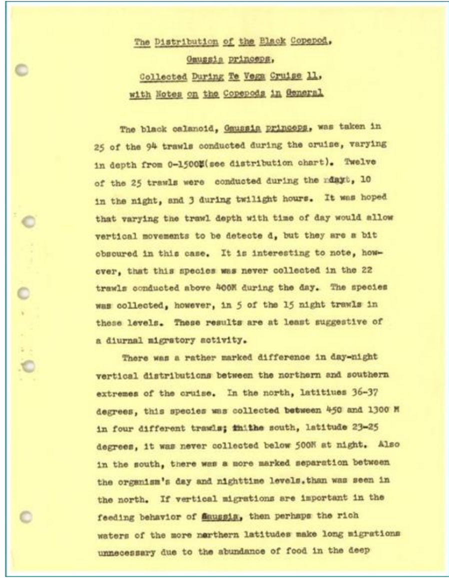
Scientific Reports



The Distribution of the Black Copepod,
Gaussia princeps,
Collected During Te Vega Cruise 11,
with Notes on the Copepods in General

The black calanoid, Gaussia princeps, was taken in 25 of the 94 trawls conducted during the cruise, varying in depth from 0-1500M(see distribution chart). Twelve of the 25 trawls were conducted during the day, 10 in the night, and 3 during twilight hours. It was hoped that varying the trawl depth with time of day would allow vertical movements to be detecte d, but they are a bit obscured in this case. It is interesting to note, however, that this species was never collected in the 22 trawls conducted above 400M during the day. The species was collected, however, in 5 of the 15 night trawls in these levels. These results are at least suggestive of a diurnal migratory activity.

There was a rather marked difference in day-night vertical distributions between the northern and southern extremes of the cruise. In the north, latitiues 36-37 degrees, this species was collected between 450 and 1300 M in four different trawls; in the south, latitude 23-25 degrees, it was never collected below 500M at night. Also in the south, there was a more marked separation between the organism's day and nighttime levels.than was seen in the north. If vertical migrations are important in the feeding behavior of Gaussia, then perhaps the rich waters of the more northern latitudes make long migrations unnecessary due to the abundance of food in the deep

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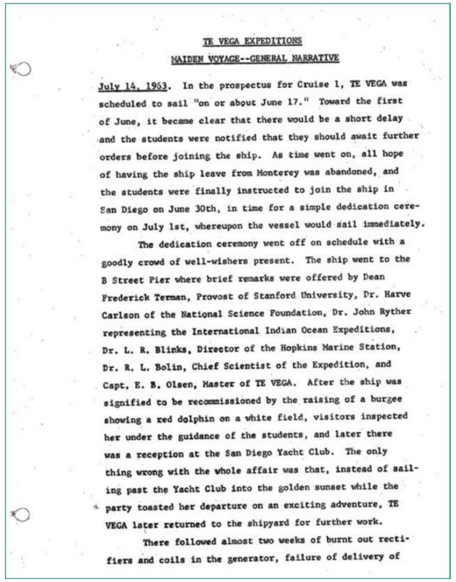
Narratives



TE VEGA EXPEDITIONS
MAIDEN VOYAGE--GENERAL NARRATIVE

July 14, 1963. In the prospectus for Cruise 1, TE VEGA was scheduled to sail "on or about June 17." Toward the first of June, it became clear that there would be a short delay and the students were notified that they should await further orders before joining the ship. As time went on, all hope of having the ship leave from Monterey was abandoned, and the students were finally instructed to join the ship in San Diego on June 30th, in time for a simple dedication ceremony on July 1st, whereupon the vessel would sail immediately.

The dedication ceremony went off on schedule with a goodly crowd of well-wishers present. The ship went to the B Street Pier where brief remarks were offered by Dean Frederick Terman, Provost of Stanford University, Dr. Harve Carlson of the National Science Foundation, Dr. John Ryther representing the International Indian Ocean Expeditions, Dr. L. R. Blinks, Director of the Hopkins Marine Station, Dr. R. L. Bolin, Chief Scientist of the Expedition, and Capt. E. B. Olsen, Master of TE VEGA. After the ship was signified to be recommissioned by the raising of a burgee showing a red dolphin on a white field, visitors inspected her under the guidance of the students, and later there was a reception at the San Diego Yacht Club. The only thing wrong with the whole affair was that, instead of sailing past the Yacht Club into the golden sunset while the party toasted her departure on an exciting adventure, TE VEGA later returned to the shipyard for further work.

There followed almost two weeks of burnt out rectifiers and coils in the generator, failure of delivery of

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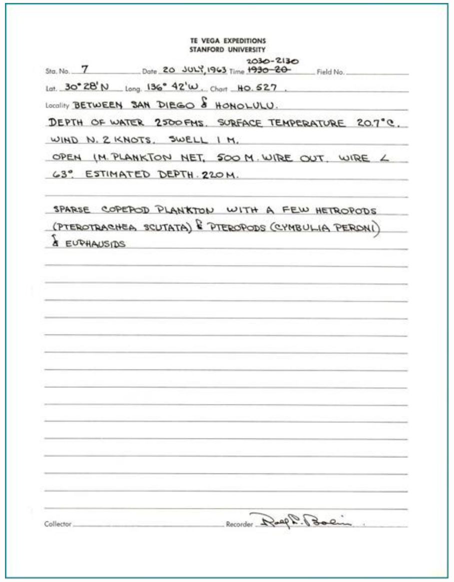
Station &
Biological Logs



TE VEGA EXPEDITIONS
STANFORD UNIVERSITY

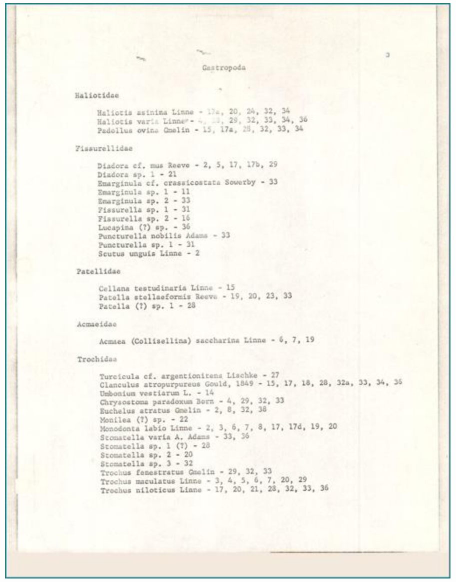
Sta. No. 7 Date 20 JULY, 1963 Time ~~1930-20~~ 2030-2130 Field No.
Lat. 30° 28' N Long. 136° 42' W. Chart HO. 527.
Locality BETWEEN SAN DIEGO & HONOLULU.
DEPTH OF WATER 2500 FMS. SURFACE TEMPERATURE 20.7° C.
WIND N. 2 KNOTS. SWELL 1 M.
OPEN 1M. PLANKTON NET. 500 M. WIRE OUT. WIRE ∠ 63°. ESTIMATED DEPTH. 220 M.

SPARSE COPEPOD PLANKTON WITH A FEW HETROPODS (PTEROTRACHEA SCUTATA) & PTEROPODS (CYMBULIA PERONI) & EUPHAUSIDS

Collector Recorder Rolf L. Bolin

100s (??)

Species Lists



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Gastropoda

Haliotidae

Haliotis asinina Linne - 17a, 20, 24, 32, 34
Haliotis varia Linne - 4, [illegible], 29, 32, 33, 34, 36
Padollus ovina Gmelin - 15, 17a, 28, 32, 33, 34

Fissurellidae

Diadora cf. mus Reeve - 2, 5, 17, 17b, 29
Diadora sp. 1 - 21
Emarginula cf. crassicostata Sowerby - 33
Emarginula sp. 1 - 11
Emarginula sp. 2 - 33
Fissurella sp. 1 - 31
Fissurella sp. 2 - 16
Lucapina (?) sp. - 36
Puncturella nobilis Adams - 33
Puncturella sp. 1 - 31
Scutus unguis Linne - 2

Patellidae

Cellana testudinaria Linne - 15
Patella stellaeformis Reeve - 19, 20, 23, 33
Patella (?) sp. 1 - 28

Acmaeidae

Acmaea (Collisellina) saccharina Linne - 6, 7, 19

Trochidae

Turcicula cf. argentionitens Lischke - 27
Clanculus atropurpureus Gould, 1849 - 15, 17, 18, 28, 32a, 33, 34, 36
Umbonium vestiarum L. - 14
Chrysostoma paradoxum Born - 4, 29, 32, 33
Euchelus atratus Gmelin - 2, 8, 32, 38
Monilea (?) sp. - 22
Monodonta labio Linne - 2, 3, 6, 7, 8, 17, 17d, 19, 20
Stomatella varia A. Adams - 33, 36
Stomatella sp. 1 (?) - 28
Stomatella sp. 2 - 20
Stomatella sp. 3 - 32
Trochus fenestratus Gmelin - 29, 32, 33
Trochus maculatus Linne - 3, 4, 5, 6, 7, 20, 29
Trochus niloticus Linne - 17, 20, 21, 28, 32, 33, 36

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+ maps, photos, data & so much more …

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Sharing thesis materials as data

The Hewatt-Sagarin Transect
1931 - present

Willis G. Hewatt, ~1933 Rafe Sagarin, 1999

Sampling the transect line, 2019

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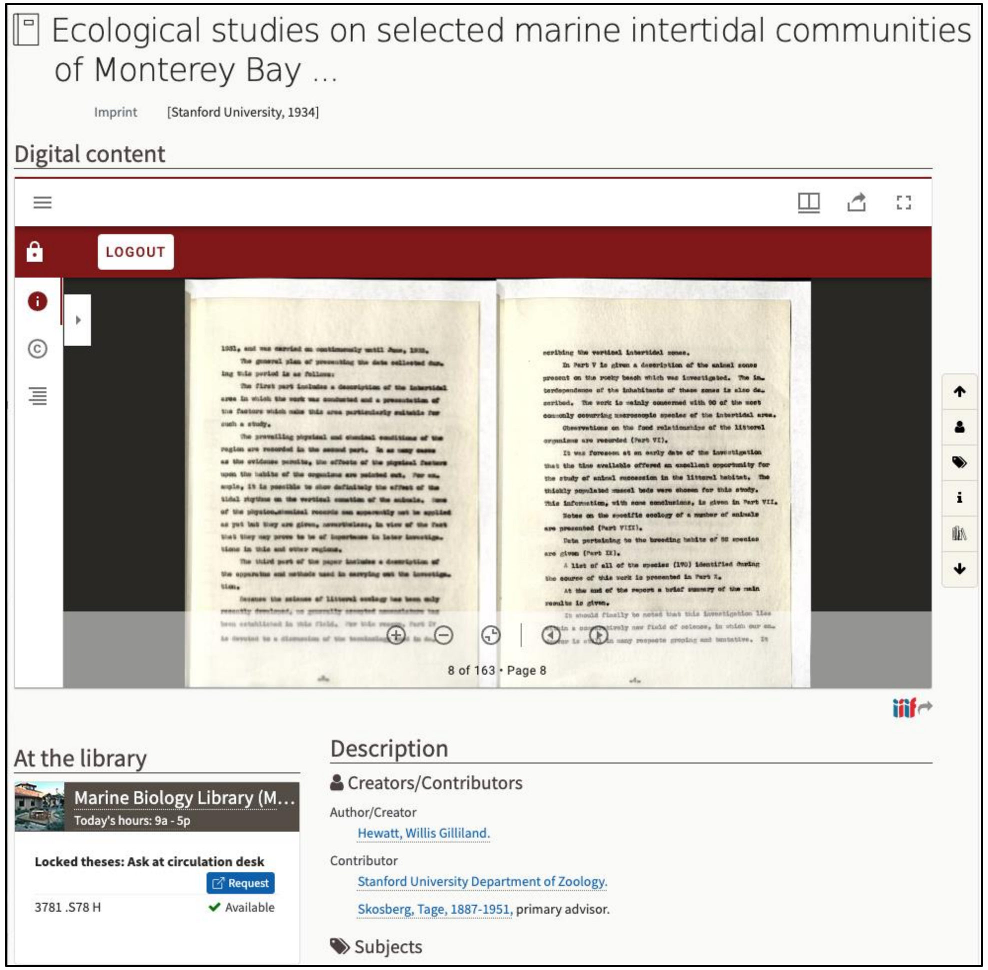
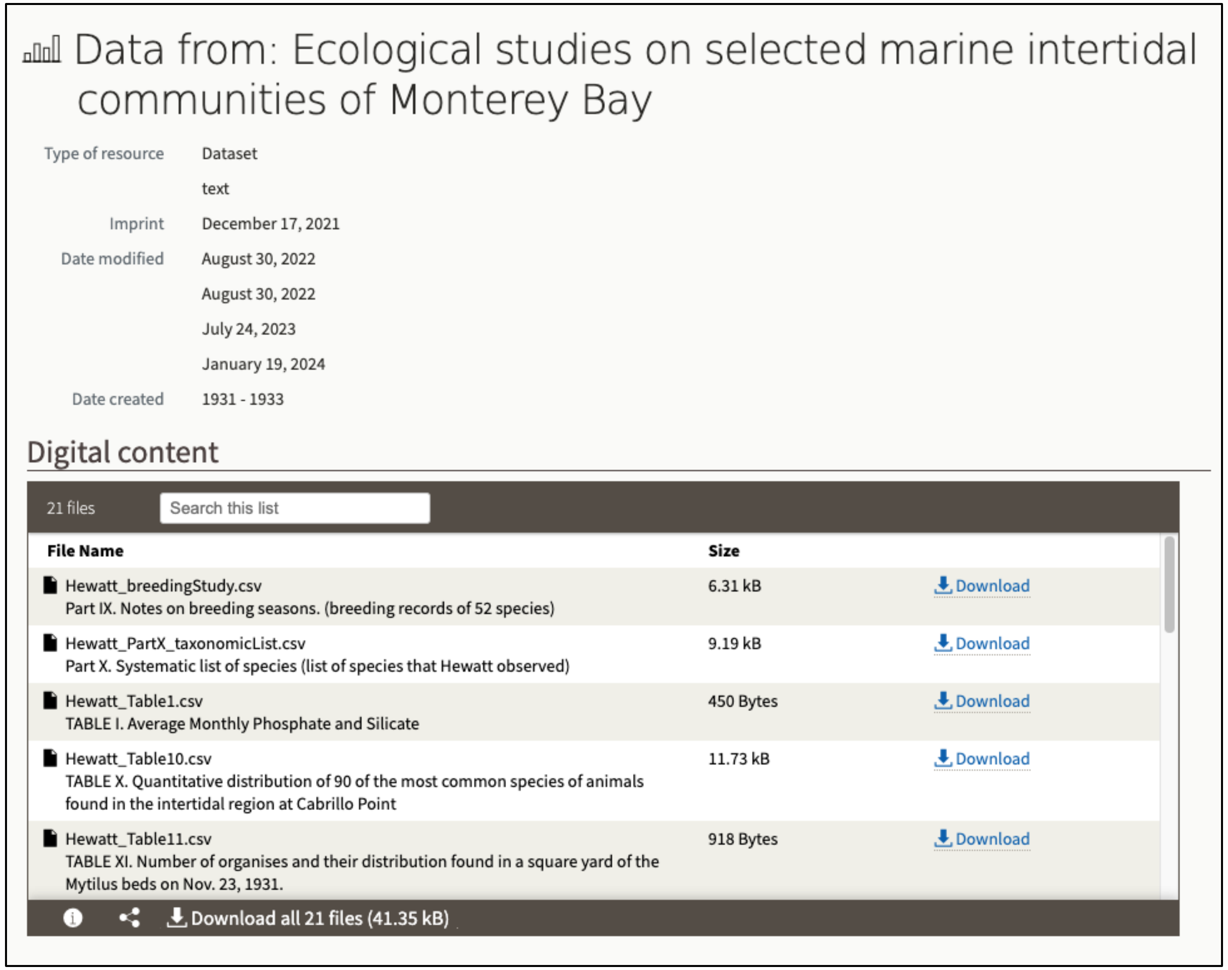


Hewatt, Willis G. (1934) "Ecological studies on selected marine intertidal communities of Monterey Bay." Thesis (Ph.D.) submitted to Stanford University. https://searchworks.stanford.edu/view/2151287



Whitmire, A. and Tabbrarah, M. (2023). Data from: Ecological studies on selected marine intertidal communities of Monterey Bay. Stanford Digital Repository. Available at https://purl.stanford.edu/zd748qn2612.

Sharing thesis materials as FAIR data

https://globalnames.org

OpenRefine Hewatt Elahi spp Permalink

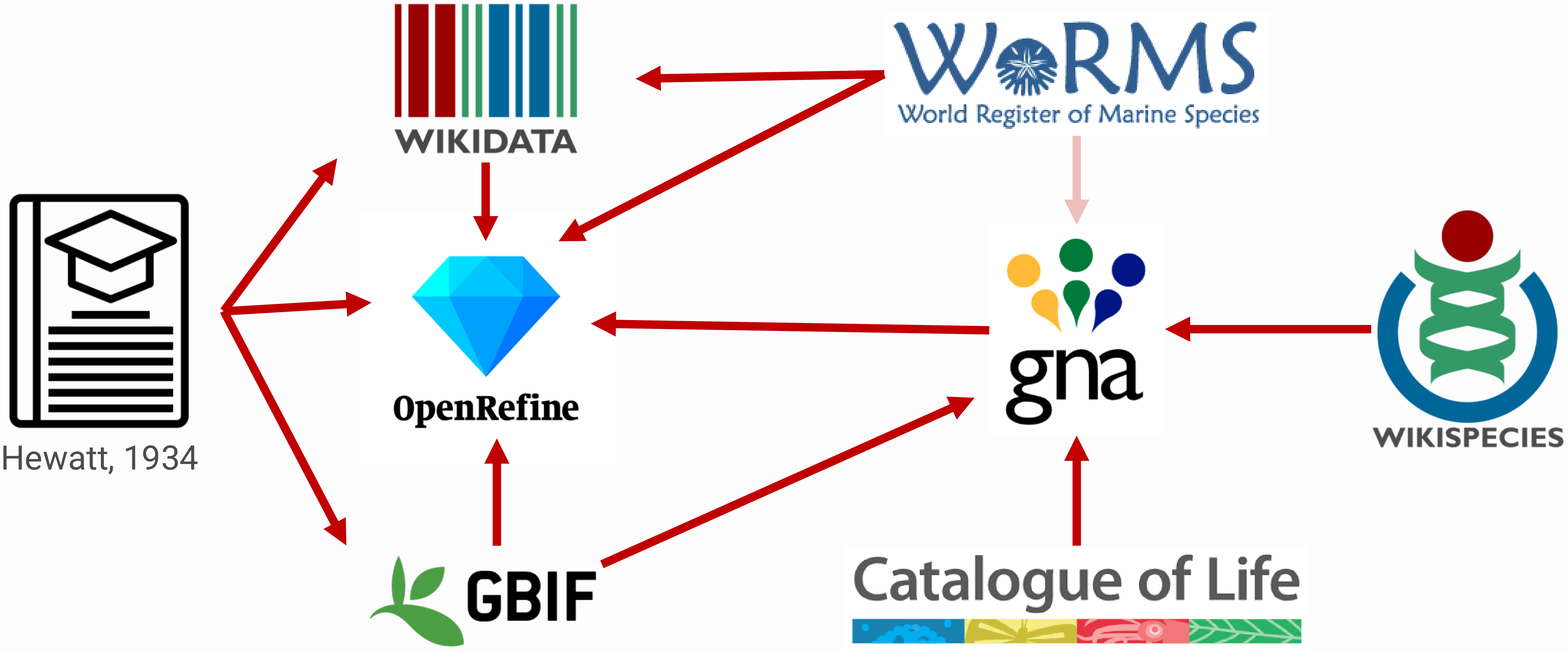
164 rows

Show as: **rows** records Show: 5 10 **25** 50 100 500 1000 rows « first ‹ previous 1 of

GBIF ID WikiData ID WoRMS ID

All	VerbatimNameHewatt	VerifMatchType	VerifMatchedName	VerifMatchedCanonical	higherClassification	GBIF-speciesKey	TaxonomicName WikiData	WikiData ID	WoRMS	WoRMS ID	VerifTaxonId
15.	Amphissa versicolor	Exact	Amphissa versicolor Dall, 1871	Amphissa versicolor	Animalia, Mollusca, Gastropoda, Neogastropoda, Columbellidae	5193688	Amphissa versicolor Choose new match	Q3141915	Amphissa versicolor Choose new match	511364	D5ZP
16.	Anisodoris nobilis	Exact	Anisodoris nobilis (MacFarland, 1905)	Anisodoris nobilis	Animalia, Mollusca, Gastropoda, Nudibranchia, Discodorididae	2292499	Peltodoris nobilis Choose new match	Q30004771	Anisodoris nobilis Choose new match	581820	78183
17.	Aplidium solidum	Exact	Aplidium solidum (Ritter & Forsyth, 1917)	Aplidium solidum	Animalia, Chordata, Ascidiacea, Aplousobranchia, Polyclinidae	2331011	Aplidium solidum Choose new match	Q4779979	Aplidium solidum Choose new match	215889	67NQ3
18.	Aplysia californica	Exact	Aplysia californica J. G. Cooper, 1863	Aplysia californica	Animalia, Mollusca, Gastropoda, Aplysiida, Aplysiidae	5191261	California sea hare Choose new match	Q1698916	Aplysia californica Choose new match	240765	FQ2Y
19.	Archidistoma psammion	Exact	Archidistoma psammion (Ritter & Forsyth, 1917)	Archidistoma psammion	Animalia, Chordata, Ascidiacea, Aplousobranchia, Polycitoridae	2330266	Archidistoma psammion Choose new match	Q4909903	Archidistoma psammion Choose new match	251982	G8XF
20.	Atylopsis	Exact	Atylopsis Stebbing, 1888	Atylopsis	Animalia, Arthropoda, Malacostraca, Amphipoda, Pleustidae	4304278	Atylopsis Choose new match	Q18588212	Atylopsis Choose new match	176930	7NQ4N
21.	Balanus glandula	Exact	Balanus glandula Darwin, 1854	Balanus glandula	Animalia, Arthropoda, Maxillopoda, Sessilia, Balanidae	2115706	Balanus glandula Choose new match	Q3809072	Balanus glandula Choose new match	394848	urn:lsid:marinespec
22.	Balanus tintinnabulum californicus	Exact	Balanus tintinnabulum californicus Pilsbry, 1916	Balanus tintinnabulum californicus	Animalia, Arthropoda, Maxillopoda, Sessilia, Balanidae	8874676	Balanus tintinnabulum californicus Choose new match	Q109653820	Balanus tintinnabulum californicus		8874676
23.	Betaeus harfordi	Exact	Betaeus harfordi (Kingsley, 1878)	Betaeus harfordi	Animalia, Arthropoda, Malacostraca, Decapoda, Alpheidae	2226201	Betaeus harfordi Choose new match	Q6488931	Betaeus harfordi Choose new match	515044	84WXQ
24.	Bugula neritina	Exact	Bugula neritina (Linnaeus, 1758)	Bugula neritina	Animalia, Bryozoa, Gymnolaemata, Cheilostomatida, Bugulidae	4984851	Bugula neritina Choose new match	Q4255986	Bugula neritina Choose new match	111158	NPRJ
25.	Calliostoma canaliculatum	Exact	Calliostoma canaliculatum (Sasao & Habe, 1973)	Calliostoma canaliculatum	Animalia, Mollusca, Gastropoda, Trochida, Calliostomatidae	2293346	Calliostoma canaliculatum Choose new match	Q2178712	Calliostoma canaliculatum Choose new match	467171	7QJ8Y

Thesis as data: FAIR connections



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