

## *Curriculum Vitae*

### *William Montrose Graham*

#### **I. Background**

##### 1. Educational History

<u>School</u>	<u>Major</u>	<u>Degree</u>	<u>Date of Degree</u>
Centre College of Kentucky	Biology		
University of North Carolina, Wilmington	Marine Biology	B.Sc.	1986
University of California, Santa Cruz	Marine Sciences	M.Sc.	1989
University of California, Santa Cruz	Biology w/ emphasis in Oceanography	Ph.D.	1994

##### 2. Professional History

<u>From – To</u>	<u>Position</u>	<u>Institution</u>
1986 – 1987	Biology Teacher	Danville H.S. (Ky)
1987 – 1989	Teaching Assistant Trainer	UC - Santa Cruz
1987 – 1994	Teaching Assistant	UC - Santa Cruz
1991	Associate in Biology	UC - Santa Cruz
1992	Summer Session Instructor	UC - Santa Cruz
1993 – 1994	Graduate Research Assistant	UC - Santa Cruz
1994 – 1995	Research Oceanographer	UC- Santa Barbara

## Professional History (Cont'd)

<u>From – To</u>	<u>Position</u>	<u>Institution</u>
2002 – 2011	Associate Professor – Marine Sciences	USA
1996 - 2002	Assistant Professor - Marine Sciences	USA
2002 – 2011	Senior Marine Scientist II	DISL
1995 - 2002	Senior Marine Scientist I	DISL
2009 – 2011	Adjunct faculty, Biological Sciences	UA
2011-	Professor of Marine Science	USM
2011-	Chair, Dept. of Marine Science	USM
2015-	Interim Director, Gulf Coast Research Laboratory	USM

## **II. Research Bibliography and Creative Achievement**

### 1. Peer-Reviewed Publications

1. Shanks, A.L. and W.M. Graham. (1987). Oriented swimming in the jellyfish *Stomolophus meleagris* L. Agassiz (Scyphozoa: Rhizostomida). *Journal of Experimental Marine Biology and Ecology*. 108(2): 159-170.
2. Shanks, A.L. and W.M. Graham. (1988). Chemical defense in a scyphomedusa. *Marine Ecology Progress Series*. 45: 81-86.
3. Graham, W.M., J.G. Field, D.C. Potts. (1992). Persistent “upwelling shadows” and their influence on zooplankton distributions. *Marine Biology*. 114: 561-570.
4. Graham, W.M. (1993). Spatio-temporal scale assessment of an “upwelling shadow” in northern Monterey Bay, California. *Estuaries*. 16: 83-91.
5. Walz, P.M., D.L. Garrison, W.M. Graham, M.A. Cattey, R.S. Tjeerdema, and M.W. Silver. (1994). Domoic acid-producing diatom blooms in Monterey Bay, California: 1991-1993. *Natural Toxins*. 2:271-279.
6. Lenarz, W.H., D. VenTresca, W.M. Graham and F.B. Schwing. (1995). Explorations of El Niños and associated biological population dynamics of central California. *California Cooperative Oceanic Fisheries Investigations, Reports*. 36:106-119.
7. Graham, W.M. and J.L. Largier. (1997). Upwelling shadows as nearshore retention sites: the example of northern Monterey Bay. *Continental Shelf Research*. 17: 509-532.
8. Graham, W. M. (1998). First report of *Carybdea alata* var. *grandis* (Reynaud 1830) (Cnidaria: Cubozoa) from the Gulf of Mexico. 16: 28-30 *Gulf of Mexico Science*.
9. Reed, D. C., M. A. Brzezinski, D. A. Coury, W. M. Graham and R. L. Petty. (1999). Neutral lipids in macroalgal spores and their role in swimming. *Marine Biology*. 133: 737-744.
10. Graham, W. M., S. MacIntyre and A. L. Alldredge. (2000). Diel patterns in the concentration of marine snow and particle flux in surface waters. *Deep-Sea Research I*. 47: 367-395.
11. Purcell, J. E., D. L. Breitburg, M. B. Decker, W. M. Graham, M. J. Youngbluth, and K. Rastoff. (2001). Pelagic Cnidarians and Ctenophores in Low Dissolved Oxygen Environments. Effects of hypoxia on living resources, with emphasis on the northern Gulf of Mexico. In NN Rabalais and RE Turner (eds.), pp. 77-100. American Geophysical Union.

12. Graham, W.M. and R Kroutil. 2001. Size-based prey selectivity and dietary shifts in the jellyfish, *Aurelia aurita*. *Journal of Plankton Research* 23:67-74.
13. Graham, W. M., F. Pages, and W. M. Hamner. (2001). A physical context for gelatinous zooplankton aggregations: a review. *Hydrobiologia* 451: 199 – 212.
14. Graham, W.M. (2001). Numerical increases and distributional shifts of *Chrysaora quinquecirrha* (Desor) and *Aurelia aurita* (Linne) (Cnidaria: Scyphozoa) in the northern Gulf of Mexico. *Hydrobiologia* 451: 97 – 111.
15. Graham, W.M., J.E. Purcell (2001). Introduction: Social, economic and ecological issues involving jellyfish blooms. In J. E. Purcell, W. M. Graham and H. J. Dumont (eds.) *Jellyfish Blooms: Ecological and Societal Importance*. Kluwer Academic. 334 pp.
16. Shipe, R. F., U. Passow, M. A. Brzezinski, , W. M. Graham, D. K. Pak, D. A. Siegel and A. L. Alldredge. (2002). Effects of the 1997-98 El Nino on seasonal variations in suspended and sinking particles in the Santa Barbara Basin. *Progress in Oceanography*. 54: 105-127
17. Graham, W. M., D. L. Martin, D. L. Felder, V. L. Asper and H. M. Perry (2003) Ecological and economic implications of a tropical jellyfish invader in the Gulf of Mexico. *Biological Invasions*. 5(1): 53-69.
18. Graham, W. M., D. L. Martin and J. C. Martin. (2003). In situ quantification and analysis of large jellyfish using a novel video profiler. *Marine Ecology Progress Series*. 254: 129-140.
19. Bolton, T. F. and W. M. Graham. (2004) Morphological variation among populations of an invasive jellyfish. *Marine Ecology Progress Series*. 278: 125-139.
20. Colin, S. P., J. H. Costello, W. M. Graham and J. H. Higgins. (2005) Omnivory by the small hydromedusae *Aglaura hemistoma*. *Limnology and Oceanography*. 50: 1264-1268
21. Johnson, D. R., H. M. Perry and W. M. Graham. (2005) Using nowcast model currents to explore transport of non-indigenous jellyfish into the Gulf of Mexico. *Marine Ecology Progress Series*. 302: 211-218
22. Bolton, T. F. and W. M. Graham. (2006) Jellyfish on the Rocks: Bioinvasion Threat of the International Trade in Aquarium Live Rock. *Biological Invasions*. 8(4): 651-653
23. Rakow, K. C. and W. M. Graham. (2006). Oriented swimming by the scyphomedusa *Aurelia* sp. against shear flow. *Limnology and Oceanography*. 51(2): 1097-1106
24. Graham, W. M. and K. M Bayha (2007). Biological invasions by marine jellyfish. *Ecological Studies* 193: 239-255.
25. Barord, G.J., W.M. Graham and K.M. Bayha (2008) First report of the invasive medusa, *Phyllorhiza punctata* von Lendenfeld (1884) in Galveston Bay, Texas. *Gulf of Mexico Science* 25: 166-167.
26. Bayha, K.M. and W.M. Graham (2008) A new Taqman© PCR-based method for the detection and identification of scyphozoan jellyfish polyps. *Hydrobiologia* 616: 217-228.
27. Bayha K.M., W.M. Graham, F.J. Hernandez, Jr. (2008) Development of a multiplex assay to identify eggs of three northern Gulf of Mexico fishes using Locked Nucleic Acid (LNA) Taqman© Real-Time PCR probes. *Aquatic Biology*. 4:65-73.
28. Pauly, D., W. Graham, S. Libralato, L. Morissette and M.L.D. Palomares (2009) Jellyfish in ecosystems, online databases, and ecosystem models. *Hydrobiologia* 616: 67-85.
29. Graham, W.M., J.H. Costello, S.P. Colin, A. Malej, D. Lucic, V. Onofri, and A. Benovic (2009) In situ manipulation of vertically migrating gelatinous zooplankton using night-time blue-water SCUBA in the south-central Adriatic Sea. *Annales Series Historia Naturalis* 19 (suppl.): 19-26.
30. Graham, W.M., L. Chiaverano, I. D'Ambra, H. Mianzan, G. Alvarez Colombo, M. Acha, A. Malej, J.H. Costello, V. Onofri, and A. Benovic (2009) Fish and jellyfish: using the isolated marine 'lakes' of Mljet Island, Croatia, to explore larger marine ecosystem complexities and ecosystem-based management approaches. *Annales Series Historia Naturalis* 19 (suppl.): 39-48.

31. I. D'Ambra and Graham, W.M. (2009) Early developmental sequence of an anthozoan parasite of the jellyfish *Aurelia* sp. 5 in an isolated marine lake (Mljet, Croatia). *Annales Series Historia Naturalis* 19 (suppl.): 59-64.
32. Costello, J.H., S.P. Colin, W.M. Graham, J.O. Dabiri, A. Benovic, D. Lucic, V. Onofri, M. Morovic, A. Malej, V. Turk, V. Flander-Putrlle, H. Mianzan, G. Alvarez Colombo, M. Acha (2009) Project *Meduza* in the context of its historical time. *Annales Series Historia Naturalis* 19 (suppl.): 1-10.
33. Fodrie, F.J., K.L. Heck, S.P. Powers, W.M. Graham and K. Robinson (2010) Climate-related, decadal-scale assemblage changes of seagrass-associated fishes in the northern Gulf of Mexico. *Global Change Biology* 16: 48-59.
34. Benfield, M. C. and W. M. Graham (2010) *In situ* observations of *Stygiomedusa gigantea* in the Gulf of Mexico with a review of its global distribution and habitat. *Journal of the Marine Biological Association of the United Kingdom* 90: 1079-1093.
35. Kim, C.-K., K. Park, S. P. Powers, W. M. Graham, K. M. Bayha (2010) Oyster larval transport in coastal Alabama: dominance of physical transport over biological behavior in a shallow estuary. *Journal of Geophysical Research-Oceans* 115 C10019 16 pp.
36. Hernandez, Jr., F. J., S. P. Powers and W. M. Graham (2010) Detailed Examination of Ichthyoplankton Seasonality from a High-Resolution Time Series in the Northern Gulf of Mexico during 2004–2006. *Transactions of the American Fisheries Society* 139: 1511-1525.
37. Hernandez, Jr., F. J., S. P. Powers and W. M. Graham (2010) Seasonal variability in ichthyoplankton abundance and assemblage composition in the northern Gulf of Mexico off Alabama. *Fisheries Bulletin*. 108: 193-207.
38. Graham, W.M., R.H. Condon, R.H. Carmichael, I. D'Ambra, H.K. Patterson, L.J. Linn, and F.J. Hernandez, Jr. (2010) Oil carbon entered the coastal planktonic food web during the *Deepwater Horizon* oil spill. *Environmental Research Letters* 5: 045301, 6 pp. [This article was one of the top five highest rated for 2010 by ERL]
39. Ajemian, M.J., D. Dolan, W.M. Graham and S.P. Powers. (2011). First Evidence of Elasmobranch Predation by a Waterbird: Stingray Attack and Consumption by the Great Blue Heron (*Ardea herodias*). *Waterbirds*. 34:117-120.
40. Dzwonkowski, B., K. Park, H.-K. Ha, W.M. Graham, F.J. Hernandez, and S.P. Powers. (2011). Hydrographic variability on a coastal shelf directly influenced by estuarine outflow. *Continental Shelf Research*. 31: 939-950.
41. Condon, R., D. Steinberg, P. del Giorgio, T. Bouvier, D. Bronk, W. Graham, H. Ducklow (2011) Jellyfish blooms result in a major microbial respiratory sink of carbon in marine systems. *Proceedings of the National Academy of Sciences*. 108: 10225-10230.
42. Carmichael, C.A., W.M. Graham, L.J. Linn, K.L. Lemkau, R.K. Nelson, and C.M. Reddy (2012). Floating oil-covered debris from Deepwater Horizon: identification and application. *Environmental Research Letters*. 7: 015301, 6 pp.
43. Carassou, L., F.J. Hernandez, Jr., S.P. Powers, W.M. Graham (2012) Cross-shore, seasonal, and depth related structure of ichthyoplankton assemblages in coastal Alabama. *Transactions of the American Fisheries Society*. 141(4), 1137-1150 DOI: 10.1080/00028487.2012.675920
44. Aeppli, C., C.A. Carmichael, R.K. Nelson, K.L. Lemkau, W.M. Graham, M.C. Redmond, D.L. Valentine, and C.M. Reddy (2012) Oil Weathering after the Deepwater Horizon Disaster Led to the Formation of Oxygenated Residues. *Environmental Science & Technology* 2012 46 (16), 8799-8807.
45. Carmichael R.H., W.M. Graham, A. Aven, G. Worthy, S. Howden (2012) Were Multiple Stressors a 'Perfect Storm' for Northern Gulf of Mexico Bottlenose Dolphins (*Tursiops truncatus*) in 2011? PLoS ONE 7(7): e41155. doi:10.1371/journal.pone.0041155
46. Miller, M.E.C. and W.M. Graham (2012) Environmental evidence that seasonal hypoxia enhances survival and success of jellyfish polyps in the northern Gulf of Mexico. *Journal of*

- Experimental Marine Biology and Ecology*. 432, 113-120. DOI: 10.1016/j.jembe.2012.07.015
47. Hernandez, F.J., Jr., L. Carassou, S. Muffelman, S.P. Powers and W.M. Graham. (2011) Comparison of two plankton net mesh sizes for the collection of ichthyoplankton in the northern Gulf of Mexico. *ICES Journal of Marine Science*. 108(2-3), 327-335. DOI:10.1016/j.fishres.2010.12.029
  48. Chanton, JP, J. Cherrier, R.M. Wilson, J. Sarkodee-Adoo, S. Bosman, A. Mickle, and W.M. Graham (2012) Radiocarbon evidence that carbon from the Deepwater Horizon spill entered the planktonic food web of the Gulf of Mexico. *Environmental Research Letters*. 7(4), 045303. DOI: 10.1088/1748-9326/7/4/045303
  49. Bayha, K.M., W.M. Graham, J.E. Higgins, H.A. Fletcher (2012) Predation potential of the jellyfish *Drymonema larsoni* Bayha & Dawson (Scyphozoa: Drymonematidae) on the moon jellyfish *Aurelia* sp in the northern Gulf of Mexico. *Hydrobiologia*. 690(1), 189-197. DOI: 10.1007/s10750-012-1038-8
  50. Lucas, C.H., W.M. Graham and C. Widmer (2012). Jellyfish life histories: Role of polyps in forming and maintaining scyphomedusa populations. *Advances in Marine Biology*. 63, 133-196. DOI: 10.1016/B978-0-12-394282-1.00003-X
  51. Condon, R.H., W.M. Graham, C.M. Duarte, K.A. Pitt, C.H. Lucas, S.H.D. Haddock, K. Sutherland, K. Robinson, M.N. Dawson, M.B. Decker, C.E. Mills, J.E. Purcell, A. Malej, H. Mianzan, S. Uye, S. Gelcich and L.P. Madin (2012) Questioning the Rise of Gelatinous Zooplankton in the World's Oceans. *Bioscience*. 62(2), 160-169. DOI: 10.1525/bio.2012.62.2.9
  52. Peterson, C.H., S.S. Anderson, G.N. Cherr, R.F. Ambrose, S. Anghera, S. Bay, M. Blum, R. Condon, T.A. Dean, M. Graham, M. Guzy, S. Hampton, S. Joye, J. Lambrinos, B. Mate, D. Meffert, S.P. Powers, P. Somasundaran, R.B. Spies, C.M. Taylor, R. Tjeerdema, E.E. Adams (2012). A tale of two spills: Novel Science and Policy Implications of an Emerging New Oil Spill Model. *Bioscience*. 62(5), 461-469. DOI: 10.1525/bio.2012.62.5.7
  53. Duarte, C.M., K. Pitt, C. Lucas, J. Purcell, S.-I. Uye, K. Robinson, L. Brotz, M.B. Decker, K.R. Sutherland, A. Malej, L. Madin, H. Mianzan, J.-M. Gili, V. Fuentes, D. Atienza, F. Pages, D. Breitbart, J.C. Malek, W.M. Graham and R. Condon (2013). Is global ocean sprawl a cause of jellyfish blooms? *Frontiers in Ecology and the Environment*. 11(2), 91-97. DOI: 10.1890/110246
  54. Condon RH, Duarte CM, Pitt KA, Robinson KL, Lucas CH, Sutherland KR, Mianzan HW, Bogeberg M, Purcell JE, Decker MB, Uye S, Madin LP, Brodeur RD, Haddock SHD, Malej A, Parry GD, Eriksen E, Quinones J, Acha M, Harvey M, Arthur JM, Graham WM. (2013) Recurrent jellyfish blooms are a consequence of global oscillations. *Proceedings of the National Academy of Sciences*. 110(3), 1000-1005. DOI: 10.1073/pnas.1210920110
  55. Robinson, K.L. and W.M. Graham (2013) Long-term change in the abundances of northern Gulf of Mexico scyphomedusae *Chrysaora* sp. and *Aurelia* spp. with links to climate variability. *Limnology and Oceanography*. 58(1), 235-253.
  56. Hernandez FJ, L Carassou, WM Graham, and SP Powers (2013) Evaluation of the taxonomic sufficiency approach for ichthyoplankton community analysis. *Marine Ecology Progress Series*. 491: 77-90. doi:10.3354/meps10475.
  57. Lucas, C.H., Graham W.M., C. Widmer (2013) Jellyfish life histories: role of polyps in forming and maintaining scyphomedusa populations. *Advances in Marine Biology*. 63: 133-196.
  58. D'Ambra, I., W.M. Graham, R.H. Carmichael, A. Malej, V. Onofri (2013) Predation patterns and prey quality of medusae in a semi-enclosed marine lake: implications for food web energy transfer in coastal marine ecosystems. *Journal of Plankton Research* 35:1305-1312.

59. Mianzan, H., J Quiñones, S Palma, A Schiariti, M. Acha, K.L. Robinson, and W.M. Graham (2014) *Chrysaora plocamia*: A poorly understood jellyfish from South American waters. In: Jellyfish Blooms, KA Pitt and CH Lucas [Eds]. Springer-Link. New York. Pp. 219-236. doi: 10.1007/978-94-007-7015-7
60. Bayha KM and WM Graham (2014) Nonindigenous marine jellyfish: invasiveness, invisibility, and impacts. In: Jellyfish Blooms, KA Pitt and CH Lucas [Eds]. Springer-Link. New York. pp.45-77. doi: 10.1007/978-94-007-7015-7
61. D'Ambra, I., R.H. Carmichael and W.M. Graham (2014) Determination of  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  and trophic fractionation in jellyfish: implications for food web ecology. *Marine Biology* 161:473-480.
62. Graham W.M., S. Gelcich, K.L. Robinson, C. Duarte, R. Brodeur, L. Madin, H. Mianzan, K.R. Sutherland, S.-I. Uye, K. Pitt, C. Lucas, M. Bøgeberg, L. Brotz, R.H. Condon (2014). Linking human well-being and jellyfish: ecosystem services, impacts and social response. *Frontiers in Ecology and the Environment* 12(9): 515-523.
63. Robinson, K.L., J.J. Ruzicka, M.B. Decker, R.D. Brodeur, F.J. Hernandez, J. Quiñones, E.M. Acha, S.-i. Uye, H. Mianzan, W.M. Graham (2014). Jellyfish, forage fish, and the world's major fisheries. *Oceanography* 27(4):104–115, <http://dx.doi.org/10.5670/oceanog.2014.90>.
64. Carassou, L., F.J. Hernandez and W.M. Graham. 2014. Change and recovery of coastal mesozooplankton community structure during the Deepwater Horizon oil spill. *Environmental Research Letters* 9 124003.
65. D'Ambra, I., W.M. Graham, R.H. Carmichael and F.J. Hernandez, Jr. 2014. Fish rely on scyphozoan hosts as a primary food source: evidence from stable isotope analysis. *Marine Biology* 162(2): 247-252. DOI: 10.1007/s00227-014-2569-5.
66. Lucas, C. H., D.O.B. Jones, C.J. Hollyhead, R. H. Condon, C. M. Duarte, W.M. Graham, K. L. Robinson, K. A. Pitt, M. Schildhauer, J. Regetz. (2014). Gelatinous zooplankton biomass in the global oceans: geographic variation and environmental drivers. *Global Ecology and Biogeography*, 23: 701–714. doi: 10.1111/geb.12169
67. Olsen, Z., R. Fulford, K. Dillon, W. Graham. (2014). Trophic role of gulf menhaden *Brevoortia patronus* examined with carbon and nitrogen stable isotope analysis. *Marine Ecology Progress Series*, 497: 215-227.
68. Robinson, K.L., W.M. Graham (2014). Warming of subtropical coastal waters accelerates *Mnemiopsis leidyi* growth and alters timing of spring ctenophore blooms. *Marine Ecology Progress Series* 502: 105-115.
69. S. Anderson, C. Peterson, G. Cherr, R. Ambrose, S. Anghera, S. Bay, M. Blum, R. Condon, T. Dean, W. Graham, M. Guzy, S. Hampton, S. Joye, J. Lambrinos, B. Mate, D. Meffert, Powers, S., Somasundaran, P., Spies, R., Taylor, C., Tjeerdema, R. and by NCEAS Gulf Oil Spill EcoTox Working Group (2014). Understanding and Properly Interpreting the 2010 Deepwater Horizon Blowout, in Oil Spill Remediation: Colloid Chemistry-Based Principles and Solutions (eds P. Somasundaran, P. Patra, R. S. Farinato and K. Papadopoulos), John Wiley & Sons, Inc, Hoboken, NJ. doi: 10.1002/9781118825662.ch2

#### Other Publications

- Graham, W. M. (2001). Carnivorous jellyfish. In S. Mackinson, T.A. Okey and B. Mahmoudi (eds.) A preliminary model of the west Florida shelf food web for use in ecosystem-based fisheries management and research. Florida Marine Research Publications, Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, St. Petersburg.
- Graham, W. M. (2004). Navigating tenure and promotion: strategies for the newly-employed *Limnology and Oceanography Bulletin*. 12: 85-86.

Graham, W. M. and T. F. Bolton (2005). Understanding a novel marine bioinvasion through theory, modeling and new molecular techniques. *Current* 21: 10-12.

Graham, W.M. (2008) Jellyfish bloom in troubled waters. *Marine Scientist* 23: 24-27

## 2. Books, Supplements and Edited Volumes

Purcell, J. E., W. M. Graham and H. J. Dumont (eds), 2001. Jellyfish Blooms: Ecological and Societal Importance. Developments in Hydrobiology 155. Kluwer Academic Publishers, Reprinted from *Hydrobiologia*. Dordrecht: xviii+334 pp.

Graham, W. M. (2012). Oceanography and the *Deepwater Horizon* oil spill. Brooks/Cole Enrichment Module, Cengage Learning, Brooks/Cole, Belmont, CA. 31 pp.

## 3. Technical Reports

W. M. Graham, J. Stout and W. W. Schroeder. 1998. Case-Study Review of the Mobile Area Contingency Plan. In: Evaluation of Gulf Contingency Plans with Respect to Restoration and Remediation. U.S. Army Corps of Engineers Final Project Report. DISL Technical Report 98-002.

Graham, W.M. 2006. Relationship Between Invasive and Native Jellyfish and OCS Platforms: A Literature Review and Field Investigation. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2007, 211pp.

Graham, W. M., S. P. Powers, F. J. Hernandez, Jr., S. Bosarge, K. Park, K. L. Heck (2009). Compass Port Baseline Marine Survey, Lease Block MO910. Final Report Prepared for ConocoPhillips, 2004-GPS-MSA-NC-0085, 134 pages.

## 4. Published Abstracts from Professional Meetings

A.L. Shanks and W.M. Graham. 1987. Oriented swimming in the jellyfish *Stomolophus meleagris* L. Agassiz (Scyphozoa: Rhizostomida). Behavioral Ecology of Zooplankton Meeting, Savannah, GA.

W.M. Graham. 1988. Offshore upwelling and limits to dispersal and recruitment of *Cancer* spp. crabs in northern Monterey Bay. American Society of Zoologists, San Francisco, CA.

A.L. Shanks and W.M. Graham. 1989. Oriented swimming in the jellyfish *Stomolophus meleagris* L. Agassiz (Scyphozoa: Rhizostomida). 5th International Conference on Coelenterate Biology, Southampton, England.

Graham, W.M. 1989. Long-term association of *Cancer* spp. crabs with scyphomedusae in Monterey Bay. 5th International Conference on Coelenterate Biology, Southampton, England.

Graham, W.M. 1991. Nearshore fronts: Barriers to larval dispersal. American Fisheries Society, California/Nevada Chapter, San Francisco, CA. (INVITED).

Graham, W.M., D.C. Potts and J.G. Field. 1992. The influence of 'upwelling shadows' on larval and zooplankton community distributions. AGU/ASLO Ocean Sciences Meeting, New Orleans, LA.

Graham, W.M. and J.L. Largier. 1992. A record of intra- and inter-annual variability of the northern Monterey Bay 'upwelling shadow'. AGU Fall Meeting, San Francisco, CA. (INVITED).

Garrison, D.L., W.M. Graham and others. 1994. Domoic acid producing diatom blooms in Monterey Bay, California. AGU Ocean Sciences Meeting, San Diego, CA.

- Graham, W.M. 1994. Upwelling shadows as nearshore retention sites: the northern Monterey Bay example. AGU Ocean Sciences Meeting, San Diego, CA.
- J.L. Largier, S.R. Wing, W.M. Graham, L.W. Botsford. 1996. Observations of northern California upwelling-intermittency, along-shore variability and poleward transport over the inner shelf. American Geophysical Union, Ocean Sciences Meeting, San Diego, CA.
- W.M. Graham, S. Ralston and W.H. Lenarz. 1997. Aggregation patterns of the scyphomedusa *Chrysaora fuscescens* along central California. American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Santa Fe, NM. (INVITED).
- R.R. Alley and W.M. Graham. 1997. Developing a nutritional index for scyphomedusae: preliminary results. American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Santa Fe, NM.
- W.M. Graham and A.L. Alldredge. 1997. Evaluation of camera-derived POC flux by comparison with a drifting sediment trap. American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Santa Fe, NM.
- W. M. Graham and A. L. Alldredge. 1998. Diel changes in marine snow abundance in the Santa Barbara Channel (USA): possible controls by vertical migrators. The Oceanography Society/International Oceanographic Council Meeting, Paris, France.
- W. M. Graham. 1999. Evidence for phylogenetic constraints of the cnidarian body plan on jellyfish growth rates: a new perspective on food-limitation. American Society for Limnology and Oceanography, Aquatic Sciences Meeting, Santa Fe, NM.
- S. J. Hixon and W. M. Graham. 1999. Respiratory response of the moon jellyfish *Aurelia aurita* to pulsed food. American Society for Limnology and Oceanography, Aquatic Sciences Meeting, Santa Fe, NM.
- A. M. Cinkovich and W. M. Graham. 1999. Observations of jellyfish around density discontinuities using an in situ video profiler. American Society for Limnology and Oceanography, Aquatic Sciences Meeting, Santa Fe, NM.
- W.M. Graham, and J. Dindo. 2000. Developing Collaboration Between Ocean Scientists and Science Educators: Should Old Sea Dogs Learn New Tricks? (INVITED) American Society for Limnology and Oceanography, Copenhagen Denmark.
- J.C. Martin and W.M. Graham. 2000. Using in situ videography to describe fine-scale distributions of gelatinous megaplankton in the northern Gulf of Mexico. International Conference on Jellyfish Blooms, Gulf Shores, AL.
- R.R. Alley and W.M. Graham. 2000. Lipid composition of jellyfish tissue: a useful indicator of recent feeding and nutritional condition. International Conference on Jellyfish Blooms, Gulf Shores, AL.
- W.M. Graham. 2000. Are jellyfish blooms in the northern Gulf of Mexico on the increase? An analysis of 10 years of fishery survey by-catch data. International Conference on Jellyfish Blooms, Gulf Shores, AL.
- H.L. Albright and W.M. Graham. 2000. Secondary productivity and trophic transfer along productivity gradients. ASLO Aquatic Sciences Meeting, Albuquerque, NM.
- W.M. Graham, D.L. Martin, H.M. Perry, and D.L. Felder. 2000. Ecological and economic implications of a new tropical jellyfish in the northern Gulf of Mexico. American Society for Limnology and Oceanography, Aquatic Sciences Meeting, Albuquerque, NM.
- H. M. Perry, T. Van Devender, W. M. Graham, D. Johnson, K. Larsen, W. D. Burke and C. Trigg. 2000. Diaphanous denizens from down under: first occurrence of *Phyllorhiza punctata* in Mississippi coastal waters. Gulf and Caribbean Fisheries Institute Meeting, Biloxi, MS.
- J.C. Martin and W.M. Graham. 2000. Spatial variability of *Phyllorhiza punctata* (Cnidaria:Rhizostomeae) within large aggregations in Lake Borgne, Louisiana. American Society for Limnology and Oceanography Aquatic Sciences Meeting, Albuquerque, NM



- W. M. Graham. 2001. Ecological and economical implications of the tropical jellyfish, *Phyllorhiza punctata*, in the northern Gulf of Mexico during the summer of 2000. Marine Bioinvasions, New Orleans, LA. (INVITED)
- W. M. Graham. 2001. Evidence for ecological change in the northern Gulf of Mexico: a summary of invasive and non-invasive jellyfish populations. Second Symposium on Marine Conservation Biology, Marine Conservation Biology Institute, San Francisco, CA. (INVITED)
- D. R. Johnson, H. Perry and W. Graham. 2001. Invasion of non-endemic species by natural means. The Joint Assembly of the International Association for the Physical Sciences of the Oceans (IAPSO) and the International Association for Biological Oceanography (IABO), Buenos Aires, Argentina.
- H. M. Perry, D. Johnson, D. Shelton, K. Larsen, W. Graham, and C. Trigg. 2002. Transport of Caribbean fauna to the north-central Gulf of Mexico by anthropogenic and natural processes: examples of recent invasions. Coastal Society 2002 Conference, Galveston, TX.
- J. D. Robinson, H. L. Albright, and W. M. Graham. 2002. Analysis of RNA:DNA ratio as an indicator of nutritional fitness of moon jellyfish. American Society for Limnology and Oceanography Aquatic Sciences Meeting, Honolulu, HI.
- Higgins III, J. E., H. L. Albright and W. M. Graham. 2002. Predation potential of *Drymonema dalmatinum* on the moon jelly, *Aurelia aurita*, in the Gulf of Mexico. American Society for Limnology and Oceanography, Summer Meeting, Victoria, B.C.
- Martin, J. C. and W. M. Graham. 2002. Multiscale analysis of the spatial variability of gelatinous zooplankton in the northern Gulf of Mexico: roles of physics and predation. American Society for Limnology and Oceanography, Summer Meeting, Victoria, B.C.
- Graham, W. M. 2002. An exploration of gelatinous zooplankton ecology from the molecular to the global ocean. American Society for Limnology and Oceanography, Summer Meeting, Victoria, B.C. (INVITED)
- Bolton, T. F., M. N. Dawson and W. M. Graham. 2002. Molecular studies of the phylogeographic structure of the tropical invader *Phyllorhiza punctata*. American Society for Limnology and Oceanography, Summer Meeting, Victoria, B.C.
- Graham, W. M. 2003. DockWatch: A volunteer program for monitoring nuisance and invasive jellyfish. Emerging Technologies, Tools, and Techniques to Manage Our Coasts in the 21<sup>st</sup> Century. EPA Technology Conference, Cocoa beach, FL.
- Colin, S. P., J. H. Costello, W. M. Graham and J. H. Higgins Feeding ecology of small hydromedusae: new omnivores on the block. Hydrozoan Society Meeting, Cape Town, S. Africa (Feb 2003)
- Benovic, A., W. M. Graham and others. Vertical migration and distribution of hydromedusae in the southern Adriatic Sea. Hydrozoan Society Meeting, Cape Town, S. Africa (Feb 2003)
- V. Turk, D. Lucic, A. Benovic, M. Ahel, M. Graham and A. Malej. Bacterial abundance and production in oligotrophic south Adriatic waters: relation to phytoplankton food web structure. European Microbiological Meeting (2002)
- Chiaverano, L. M. and W. M. Graham. The effect of parasitic anemones on the morphology of *Aurelia* sp. (Scyphozoa: Semaestomeae) in Mljet Lake, Croatia. American Society for Limnology and Oceanography, Summer Meeting, Savannah, GA (June 2004)
- Graham, W. M. and T. F. Bolton. Molecular and morphological comparisons of native and non-native populations of a jellyfish invader. American Society for Limnology and Oceanography, Summer Meeting, Savannah, GA (June 2004)
- Higgins, III, J. E. and W. M. Graham. The influence of water column structure on reproduction of the moon jellyfish, *Aurelia aurita* Linne, in the northern Gulf of Mexico. American Society for Limnology and Oceanography, Summer Meeting, Savannah, GA (June 2004)
- Rakow, K. C. and W. M. Graham. Mechanics of oriented swimming by the jellyfish, *Aurelia aurita*, in shear flow. American Society for Limnology and Oceanography, Summer Meeting, Savannah, GA (June 2004)

- W. M. Graham, ; Higgins, J. E. ; Martin, J. C. ; Rakow, K. C. Beneath the surface: vertical structure of gelatinous zooplankton aggregations in shallow coastal waters. American Society for Limnology and Oceanography, Summer Meeting Santiago de Compostela, Spain (June 2005)
- Bayha, K.M., T. Bolton and W.M. Graham. Worldwide phylogeography of the invasive jellyfish *Phyllorhiza punctata*. Evolution 2006: Joint meeting of the Society for the Study of Evolution, the Society of Systematic Biologists, and the American Society of Naturalists. Stony Brook, New York. June 23-27 2006.
- Chiaverano, L.M. and W.M. Graham. Phenotypic plasticity in polyps of the moon jellyfish *Aurelia* sp. (Cnidaria: Scyphozoa) in response to developmental temperature and food availability. Evolution 2006: Joint meeting of the Society for the Study of Evolution, the Society of Systematic Biologists, and the American Society of Naturalists. Stony Brook, New York. June 23-27 2006.
- Hernandez, F.J., Jr., S. Powers, K. Park and W. Graham. Winter ichthyoplankton assemblages in the northern Gulf of Mexico: vertical distributions and offshore intrusions. 30th Annual Larval Fish Conference. Lake Placid, NY. 10-14 September 2006.
- Beck, A., S. Muffelman, F. Hernandez, Jr., S. Powers, W. Graham. A comparison of mesh sizes for the collection of ichthyoplankton in the northern Gulf of Mexico (Alabama, USA). 30th Annual Larval Fish Conference. Lake Placid, NY. 10-14 September 2006.
- Graham, W. M., J. H. Costello, S. P. Colin, A. Malej, D. Lucic, V. Onofri, A. Benovic, A Swimming with mesopelagics. American Society for Limnology and Oceanography, Winter Meeting, Santa Fe, NM (February 2007). ORAL
- Chiaverano, L. M. and W. M. Graham. Seasonal dynamics of parasitism and its effect on morphology and reproduction of the moon jellyfish *Aurelia* sp. from a marine lake in Croatia. American Society for Limnology and Oceanography, Winter Meeting, Santa Fe, NM (February 2007).
- Bayha, K. M., M. E. Miller, and W. M. Graham. Development Of A Taqman® Real-Time PCR assay for the detection of benthic scyphozoan jellyfish polyps. American Society for Limnology and Oceanography, Winter Meeting, Santa Fe, NM (February 2007).
- Bayha, K.M., T. Bolton, and W.M. Graham. Phylogeography of an invasive jellyfish indicates multiple independent invasions and intense founder effects. Second International Conference on Jellyfish Blooms, Gold Coast, Australia (June 2007).
- Chiaverano, L. M., W. M. Graham Morphological plasticity in polyps of *Aurelia* sp in response to developmental temperature and food availability, and its subsequent effects on ephyrae: an experimental approach. Second International Conference on Jellyfish Blooms, Gold Coast, Australia (June 2007).
- Graham, W.M., J.E. Higgins III, K. Park. The role of water column structure on jellyfish aggregation and reproduction in shallow coastal waters. Second International Conference on Jellyfish Blooms, Gold Coast, Australia (June 2007). ORAL
- D'Ambra, I. and W.M.Graham. Life cycle of a sea anemone parasite on *Aurelia* sp from Veliko Jezero (Mljet, Croatia). Second International Conference on Jellyfish Blooms, Gold Coast, Australia (June 2007).
- Miller, M-E.C. and W.M. Graham. The influence of ecological and physical factors on the settlement and viability of the moon jelly (Scyphozoa; *Aurelia* sp.) in the northern Gulf of Mexico. Second International Conference on Jellyfish Blooms, Gold Coast, Australia (June 2007).
- Bayha, K. M. and W. M. Graham. Development of a Multiplex Taqman© PCR Assay for the Identification of Fish Eggs in the Northern Gulf of Mexico. 31st Annual Larval Fish Conference. St. John's, Newfoundland (July 2007).

- Graham, W. M., F. J. Hernandez, Jr., and S. P. Powers. Contribution of jellyfish predation to ichthyoplankton mortality: Is there enough to matter to the stock? (Presenter) American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- Shiplett, R. M., K. M. Bayha, F. J. Hernandez, Jr., and W. M. Graham. Determining species-specific ichthyoplankton predation by jellyfish using DNA probes. American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- Miller, M. E. C. and W. M. Graham. Reduction of spatial competition between benthic fouling communities and jellyfish polyps due to seasonal hypoxia. American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- Chiaverano, L. M., K. M. Bayha and W. M. Graham. Morphometrics, molecules and ecology: the case of two co-occurring species of moon jellyfish distributed along an environmental gradient in the Gulf of Mexico. American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- Millett, A. F., W. M. Graham, K. L. Robinson, G. Zapfe and J. Lyczowski-Shultz. Can jellyfish blooms alter mesozooplankton community structure? American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- Robinson, K. L. and W. M. Graham. Long-term variability of the populations of the schyphomedusae *Aurelia* sp. and *Chrysaora quinquecirrha* in the northern Gulf of Mexico with links to climate change. (Best Student Presentation Award). American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- D'Ambra, I., R. H. Carmichael, A. Malej, C. L. Suchman, and W. M. Graham. Using stable isotopes to assess trophic position of *Aurelia* sp. 5 (Cnidaria: Schyphomedusae) in Mljet Lakes (Croatia). American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- Collini, R. C., F. J. Hernandez, Jr., I. D'Ambra, and W. M. Graham. Assessing ichthyoplankton predation risk to resolve patterns and processes due to gelatinous zooplankton feeding. American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), January 2009.
- Hernandez, Jr., F., S. Powers and W. Graham. Variability in larval fish distribution and abundance in the northern Gulf of Mexico. 139<sup>th</sup> Annual Meeting of the American Fisheries Society, Nashville, Aug 30- Sep 3, 2009.
- Graham, W., F. Hernandez, Jr., and S. Powers. Design and implementation of a marine biological baseline study in the northern Gulf of Mexico. 139<sup>th</sup> Annual Meeting of the American Fisheries Society, Nashville, Aug 30- Sep 3, 2009.
- Hernandez, Jr., F., S. Powers and W. Graham. Jellyfish predation on ichthyoplankton in the northern Gulf of Mexico: estimating the impact on recruitment and fisheries. 33<sup>rd</sup> Annual Larval Fish Conference, American Society of Ichthyologists and Herpetologists, Portland, OR, 22-27 July, 2009.
- Muffelman, S., R. Collini, F. Hernandez, Jr., K. Bayha, S. Powers, W. Graham. Spatial and Temporal Distributions of Vermilion Snapper (*Rhomboplites aurorubens*) and Red Snapper (*Lutjanus campechanus*) Eggs and Larvae in the Northern Gulf of Mexico. 33<sup>rd</sup> Annual Larval Fish Conference, American Society of Ichthyologists and Herpetologists, Portland, OR, 22-27 July, 2009.
- Robinson, K. L. and W.M. Graham. Variability in northern Gulf of Mexico Mnemopsis leidyi populations in relation to seasonal refugia and physical thresholds. Poster Presentation. 3<sup>rd</sup> International Jellyfish Blooms Symposium. Mar del Plata, Argentina. July 2010.
- Quiñones, J., H. Mianzan, M. Acha, S. Purca, W. Graham, and K. Robinson. El Viejo, El Niño and Jellyfishes: Dramatic environmental-driven changes in jellyfish abundances off Peru. Oral Presentation. 3<sup>rd</sup> International Jellyfish Blooms Symposium. Mar del Plata, Argentina. July 2010.

- Chiaverano, L. M., K. M. Bayha and W. M. Graham. Intra-specific morphological variation in the upside-down jellyfish *Cassiopea* along the Florida Keys (USA): driven by phenotypic plasticity? Jelly Blooms Conference, Mar del Plata, Argentina. July 2010
- Collini, RC, W.M. Graham, H Mianzan, M Acha, A Schiariti, G Genzano. Preliminary Experiments in Establishing a Standardized Protocol for Clearance Rates of Gelatinous Zooplankton. Jelly Blooms Conference, Mar del Plata, Argentina. July 2010.
- Condon, R.H., K.A. Pitt, W.M. Graham, C.M. Duarte, C. Lucas, K. Robinson, P.A. del Giorgio, C.A. Carlson, M. Lebrato, M. Conte and R.S. Lampitt. Exploring the Paradigm of a Global Expansion in Jellyfish: Implications for Biogeochemical Cycles & Food Webs in a Changing Ocean. IMBER IMBIZO\* II: Integrating biogeochemistry and ecosystems in a changing ocean - Regional comparisons. Crete, Greece. October 2010.
- Graham, W.M., R.H Condon, R.H. Carmichael, I. D’Ambra, H.K. Patterson and J. Brandes. Oil carbon entered the coastal microbial and planktonic food web during the Deepwater Horizon oil spill. IMBER Integrating Biogeochemistry and Ecosystems in a Changing Ocean Conference, Crete, October 2010 (Poster).
- Graham, W.M., R.H Condon, R.H. Carmichael, I. D’Ambra, H.K. Patterson and F. J. Hernandez, Jr. Entry of Oil to the Coastal Planktonic Food Web During the Deepwater Horizon Spill (*Invited*). AGU Fall Meeting, San Francisco. December 2010.
- Graham, W.M., L. Carassou, R.H Condon, I. D’Ambra, F. J. Hernandez, Jr. and A. Hunter. Can injuries to the water column by the Deepwater Horizon spill be resolved from zooplankton community analysis? (*Invited*). Bureau of Ocean Energy Management, Regulation and Enforcement Information Transfer Meeting, New Orleans. March 2011.
- Graham, W.M. Deepwater Horizon: Science, Crisis and the Public Trust. Southeastern Evolution and Ecology Conference, Auburn, AL. [*Keynote Address*]. March 2011.
- Graham, W.M., R. Condon, A. Ortmann, L. Carassou, R. Fulford, R. Kiene, N. Shelton, and L. Linn, Was there a collapse of lower trophic structure on the northern Gulf shelf during *Deepwater Horizon*? 21<sup>st</sup> Biennial Conference of the Coastal and Estuarine Research Federation, Daytona Beach, FL. November 2011.
- Graham, W. M., S. Gelcich, C.M. Duarte, S. Uye, R. D. Brodeur, R. H. Condon and NCEAS Jellyfish Working Group. Jellyfish and fisheries: Risks, trade-offs and adaptations. PICES-2012, Hiroshima, Japan October, 2012 (Invite Plenary)

### III. Research Activities

#### 1. Major Oceanographic Cruises

<u>Date</u>	<u>Vessel</u>	<u>Region/Chief Scientist/Study</u>
1988	R/V Wecoma	Northeast Pacific/ Chavez -Coastal Transition Zone
1990	R/V New Horizon	Monterey Bay/ Dugdale – ‘Shift-up’
1991	R/V Sproul	Guide Seamount/ LeBoeuf – Seal Release
1992	R/V D.S. Jordan	Coastal Central Calif./ NOAA/NMFS Rockfish
1994	R/V Sproul	Santa Barbara Channel/ Winant – Mooring deployment
1994	R/V Sproul	SB Channel/ Winant – Mooring deployment
1994	R/V Point Sur	SB Channel/ Alldredge – Marine Snow
1995	R/V Point Sur	SB Channel/ Alldredge – Marine Snow
1996	R/V Point Sur	SB Channel/ Alldredge – Marine Snow
1999	R/V Pelican	Gulf of Mexico/ Dortch/Rabalais - Hypoxia, Class Trip
1999	R/V Pelican	Gulf of Mexico/ Graham - Jellyfish Ecology, 23 d
2000	R/V UCLA SeaWorld	Monterey Bay Jellyfish Aggregations w/ W. Hamner

2000	R/V Pt. Lobos	MBARI Extension of fronts cruises w/ W. Hamner
2000	R/V Pelican	Gulf of Mexico/ Graham - JELECO 00 and 00-B, 23 d
2001	R/V Pelican	Gulf of Mexico/ Graham - JELECO 01, 24 d
2002	R/V Nase More	Adriatic cruise, Dubrovnik Croatia, 15 d
2002	R/V Walton Smith	Gulf of Mexico/ Graham – JELECO 02A, 14 d
2002	R/V Pelican	Gulf of Mexico/ Graham - JELECO 02B, 14 d
2003	R/V Nase More	Adriatic cruise, Dubrovnik Croatia, 15 d
2003	R/V Carretta (NMFS)	Gulf of Mexico/ Graham-Cowan, 9 d
2004	R/V Verrill (DISL)	Compass-Port sampling (>20 d)
2004	R/V Wilson (DISL)	Compass-Port sampling (>20 d)
2005	R/V Wilson (DISL)	Compass-Port sampling (>20 d)
2006	R/V Wilson (DISL)	Compass-Port sampling (>20 d)
2007	R/V Wilson (DISL)	Compass-Port sampling (>10 d)

## 2. Other field-related activities

1987-1994	R/V David Johnston (UC-Santa Cruz) approx. 75 day-trips
1990-1994	R/V Point Lobos (MBARI) approx. 10 day-trips
1995	R/V Jolly Roger – Mooring recovery
1995	DSV Delta – Santa Barbara Basin, 225 m dive.
1996	R/V Deborah B., Chelsea Instruments Nu Shuttle Trials
1996-1997	R/V Verrill (DISL), Mobile Bay/Plume approx. 15 day-trips
1996-1997	R/V Deborah B., Mobile Bay/Plume, 7 day-trips
1997-1998	R/V Verrill, Mobile Bay/Plume, 7 day-trips
1997-1998	R/V Deborah B., Mobile Bay/Plume, 14 day-trips
1998-1999	R/V Deborah B., Mobile Bay/Plume, 12 day-trips
2000-2001	R/V Verrill, ACES Higher Trophic Levels cruises (ATROPH)
2000-2001	Aerial surveys (Cessna 152/172), northern Gulf of Mexico, 15 day-trips
2002	Aerial surveys, northern Gulf of Mexico, 5 day-trips
2002	Field sampling, Mljet Island, Croatia, 8 d (May)
2002	Field Sampling, Indian River Lagoon 2 d
2002	Jellyfish-Turtle grazing interactions, Canada, PI Ransom Myers, Dalhousie (September)
2003-2006	Field sampling, Mljet Island, Croatia
2003-2006	Field sampling southern Adriatic Sea
2003-2004	Indian River Lagoon (FL) Rapid Assessment Survey for Invasive Species
2003-2005	Mobile Bay Rapid Assessment Survey for Invasive Species (AMRAT)
2006	Oyster larvae sampling for rapid detection using molecular probes
2007	Field Research, Patagonia Argentina (April 2007)
2007	Field Research, Diving, southern Louisiana (September 2007)
2008	Field Research, Southern Adriatic/Croatia (May 2008)
2008	Field Research, Palau (Sept-Oct 2008)
2009	Field Research, Southern Adriatic/Croatia; R/V Nase More (May 2009)

## IV. **Contracts and Grants**

### 1. Projects funded prior to USA/DISL

<u>From-To</u>	<u>Source/Amount/Project Title</u>
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1987-1989	Departmental Research Awards, \$5000, 'Recruitment of Cancer crabs in northern Monterey Bay'. Principal Investigator.
1987-1993	Friends of Long Marine Lab, \$4500, Student Research Grants. Principal Investigator.
1988-1992	International Women's Fishing Association, \$4500, 'Association between Cancer crab larvae and juveniles with large scyphozoa'. Principal Investigator.
1992-1993	American Museum of Natural History, Lerner-Gray Fund for Marine Sciences, \$3000, 'Small-scale hydrography in northern Monterey Bay'. Principal Investigator.
1992-1993	Cooperative Institutes for Research in the Integrated Ocean Sciences, \$5000, Decadal summary of AVHRR imagery along the west coast of North America. Contractor.
1993	Myers Fund for Marine Research, \$2000, 'Dynamics of large jellyfish aggregations in northern Monterey Bay'. Principal Investigator.
1994-1995	UC-Santa Barbara, Division of Natural Sciences, \$15,000, 'Establishing an interdisciplinary mooring platform for long time-series research in the Santa Barbara Channel'. Associate Investigator with A. Alldredge and others.

2. Projects funded or pending while at USA/DISL

<u>From-To</u>	<u>Source/Amount/Project Title</u>
1997	Exxon Oil. \$1500. Undergraduate summer internship. Principal Investigator. FUNDED.
1996-1998	U.S. Army Corps of Engineers (MASGC Pass-through). \$67,460. 'Study of Gulf Coast Oil Spill Contingency Plans with Respect to Remediation and Restoration.' Principal Investigator (with J. Stout and W. Schroeder co-PI / associate investigator). FUNDED.
1997-1998	NSF REU. \$70,080. Research experiences for undergraduates in coastal and nearshore marine systems of the northeastern Gulf of Mexico. Contributing Investigator (with PI Stout and others). FUNDED.
1998-1999	Mississippi-Alabama Sea Grant. \$35,060 (\$12,462 match). Estimation of water residence times and nutrient exchange in the polyhaline region of Mobile Bay. FUNDED.
1998-2004	OCE CAREER. \$390,026. Energetic consequences of feeding in a patchy environment: possible limitations to jellyfish production in coastal ecosystems. FUNDED.
1998-1999	Alabama Center for Estuarine Studies. \$15,000. Recruitment potential of Sea Nettle ( <i>Chrysaora quinquecirrha</i> ) polyps around natural and artificial substrates in Mobile Bay. FUNDED.
1998-1999	UNOLS SEANET Consortium. Proposal to install high-speed data communications for Internet access at sea. (contributing Investigator with PI S. Rabalais, LUMCON). FUNDED. (Approx. \$5000 in support for Graham's CAREER cruises beginning in 1999).
1999-2001	Alabama Center for Estuarine Studies. Effects of variation in river discharge and wind-driven resuspension on higher trophic levels in the Mobile Bay ecosystem. Approx. \$250,000. FUNDED. With J. Cowan (PI) and J. Valentine.
1999-2003	Alabama Center for Estuarine Studies. Interaction between water-column structure and reproduction in jellyfish populations of Mobile Bay. \$31,260. FUNDED.

- 2000-2003 Alabama Center for Estuarine Studies. Interaction between water-column structure and reproduction in jellyfish populations of Mobile Bay: Supplemental funding. \$13,059. FUNDED.
- 1999-2000 Mississippi-Alabama Sea Grant. Request for sponsorship of the First International Conference on Jellyfish Blooms: 'Jellyfish Blooms of North America: A Scientific and Societal Agenda'. \$36,000. FUNDED.
- 2000-2001 Mississippi-Alabama Sea Grant. Rapid response sampling to a recent non-indigenous jellyfish bloom. \$15,000. FUNDED.
- 2000-2001 Mississippi-Alabama Sea Grant and Gulf of Mexico Program. Developing a model 'Dock-Watch' program to track nuisance and invasive jellyfish blooms. \$60,001. FUNDED.
- 1999-2000 National Science Foundation Equipment Proposal (J. Pennock, PI). Associate Investigator. FUNDED.
- 1999-2000 National Science Foundation, Research Experiences for Undergraduates at the Dauphin Island Sea Lab. (J. Pennock, PI). Associate Investigator.
- 2001-2002 Minerals Management Service, Cooperative Agreement: Study of oil and gas platforms in the northern Gulf of Mexico as habitat for jellyfish polyps. ~\$117,407. FUNDED.
- 2000-2001 National Sea Grant College. Rapid response funding for ecological studies of the invasive jellyfish *Phyllorhiza punctata*. \$75,922 (\$50,000 Sea Grant share). FUNDED.
- 2001-2004 National Sea Grant Office. Deriving the origin and nature of the invasive jellyfish, *Phyllorhiza punctata*, through molecular studies of native and non-native populations. \$152,210. FUNDED.
- 2002-2003 EPA Gulf of Mexico Program. Continuation and Expansion of DockWatch: A Volunteer Observer Program for Monitoring Jellyfish Blooms and Invasions \$35,000. FUNDED.
- 2001-2004 National Sea Grant Office. Assessing the potential of nuisance jellyfish predation on the eggs and larvae of red drum and red snapper in the northern Gulf of Mexico. \$290,144, FUNDED.
- 2001-2002 Mississippi-Alabama Sea Grant Consortium, Marine Science Scholar's Program. A multi-scale analysis of the spatial variability of gelatinous zooplankton in the northern Gulf of Mexico. Support for J. Martin (M.Sc. student). \$10,000. FUNDED.
- 2002-2003 Aquatic Nuisance Species Task-Force. Cooperative program between DISL, Mobile Bay and Indian River Lagoon National Estuary Programs for invasive species outreach and education. \$20,000 to DISL. FUNDED
- 2004-2006 Mississippi-Alabama Sea Grant Consortium. A molecular genetic assay for identifying and quantifying a cryptic marine bioinvader. PI with T. Bolton. \$131,504. FUNDED.
- 2004-2006 National Science Foundation (DBI) FSML: Expansion of research and education infrastructure within Dauphin Island Sea Lab's Marine Science Hall. \$335,000. FUNDED. \$76,280 supplement awarded 9/2006.
- 2004-2006 Compass-Port Baseline Biological Survey in the northern Gulf of Mexico. Conoco-Phillips, Inc. \$1,677,972 (\$490,478 to PI Graham)
- 2004-2006 National Science Foundation (INT) International: Developing an Adriatic Summer Institute for Marine Environmental Complexity. \$43,428. FUNDED.
- 2005-2006 Supplemental Funding for Compass-Port Baseline Biological Survey in the northern Gulf of Mexico. Conoco-Phillips, Inc. \$1,677,972 (\$490,478 to PI Graham) FUNDED.

2005-2007 Development of a molecular genetic method to quantify *Crassostrea virginica* veliger larvae in Mobile Bay and eastern Mississippi Sound. \$154,421. FUNDED.

2008 – 2010 NOAA/National Marine Fisheries Service, Shelby Center for Ecosystem-Based Fisheries Management. Fisheries Oceanography Core Studies. \$148,600 to co-PI Graham.

2006-2011 Alabama Department of Conservation and Natural Resources, Marine Resources Division. Fisheries Oceanography in Coastal Alabama (FOCAL). \$5,000,000 (~\$1,100,000 to PI Graham). FUNDED.

2007-2009 NOAA/National Marine Fisheries Service, MARFIN. Sources and fate of snapper (Lutjanidae) early life history stages in Alabama shelf waters: temporal and spatial occurrence of red snapper (*Lutjanus campechanus*) and vermilion snapper (*Rhomoplites aurorubens*) eggs and larvae. \$361,465 PIs Hernandez and Powers (\$180,732 to co-PI Graham). FUNDED.

2008 – 2011 NOAA/National Marine Fisheries Service, Shelby Center for Ecosystem-Based Fisheries Management. Fisheries Oceanography Core Studies. \$248,730 to co-PI Graham. FUNDED.

2009-2011 NOAA/National Marine Fisheries Service, MARFIN. Spatial and temporal abundance and distribution of red snapper (*Lutjanus campechanus*) eggs across the northern Gulf of Mexico based on historic SEAMAP plankton surveys. \$211,258 with PI Hernandez (\$135,070 to co-PI Graham). FUNDED.

2009 – 2011 NOAA/National Marine Fisheries Service, Northern Gulf Institute. Identifying linkages between zooplankton dynamics, fisheries resources and climate change in the Northern Gulf of Mexico. (\$170,425 to co-PIs Graham and Hernandez). FUNDED.

2009 – 2011 National Center for Ecosystem Analysis and Synthesis. Global expansion of jellyfish blooms: magnitude, causes and consequences. Workshop grant to PIs R. Condon (BIOS), C. Duarte (IMEDEA, CSIC-UIB) and M. Graham. FUNDED.

2010 – 2012 National Science Foundation/ MRI-R<sup>2</sup>. Acquisition of an Autonomous Underwater Vehicle (AUV) to support marine sciences and education in the northern Gulf of Mexico. \$531,365 with co-PI S. Powers. DECLINED.

2010-2011 National Science Foundation RAPID: Resolving higher trophic-level change within the northern Gulf of Mexico ecosystem as a consequence of the *Deepwater Horizon* oil spill. \$199,867. FUNDED.

2010 Northern Gulf Institute/ BP Gulf Research Initiative. Pelagic ecosystem response to Deepwater Horizon oil spill. \$69,355. FUNDED.

2010-2011 MESC/ BP Gulf Research Initiative. Plankton dynamics in response to Deepwater Horizon oil spill. \$55,590. FUNDED.

2011 Northern Gulf Institute/ BP Gulf Research Initiative (Phase II). Does the 'priming effect' caused by Deepwater Horizon oil spill result in increased microbial and zooplankton consumption of labile and refractory dissolved organic matter? Co-PI with R. Condon. \$103,369. FUNDED.

2012-13 MS Dept. of Environmental Quality. Developing modeling application plan to model impacts of MC252 on natural resources of the Mississippi Sound. W. Graham, J. Wiggert, S. Milroy, R. Hendon, C. Rakocinski \$490,128. FUNDED.

2012-13 NOAA/Natural Resources Damage Assessment. Ichthyoplankton and zooplankton scanning and analysis for the NRDA Water Column Technical Working Group. W. Graham, \$382,114. FUNDED.

2012-15 Lenfest Ocean Program/Pew Charitable Trusts. Developing Ecosystem-Based Management Metrics for Forage Fish using Jellyfish. W. Graham, F. Hernandez. \$439,938. FUNDED.



2015-17 Gulf of Mexico Research Initiative. Consortium for Oil-Exposure Pathways in Coastal River-Dominated Ecosystems (CONCORDE). W. Graham, \$11,003,634. FUNDED.

## V. Service

### 1. Professional Memberships

The Oceanography Society  
American Society of Limnology and Oceanography  
Coastal and Estuarine Research Federation  
American Institute of Biological Sciences

### 2. Professional Service

#### a. Professional Activities

1991 Global Ocean Ecosystems Dynamics (GLOBEC), Planning Workshop for the California Current Initiative, Bodega Bay, CA  
1992 Moderator, UCSC Teaching Assistant Training workshop  
1994 NOAA Paleoclimate Workshop “Reconstructing Global Climate Change over the past two millenia from anaerobic sediments of the eastern Pacific Ocean”, San Francisco, CA  
1994 Dissertations Initiative for the Advancement of Limnology and Oceanography (DIALOG), Bermuda  
1996 Mobile Bay Monitoring Workshop, Fairhope, AL  
1996 West Coast National Undersea Research Center, Monterey Bay Initiative Science Planning Workshop, Moss Landing, CA  
1997 TIIAP (Telecommunications) Workshop for Distance Education Initiative at DISL, New Orleans, LA.  
1997 Moderator and Convener, 2-day Oil Spill Contingency Plan Workshop, DISL  
1997 Chair, Gelatinous Zooplankton Ecology Session, ASLO Ocean Sciences Meeting, Santa Fe, NM  
1998 American Geophysical Union, Ocean Sciences Meeting, San Diego, CA  
1998 The Oceanography Society Meeting, Paris, France  
1999 Session Chair, Bioenergetics of Pelagic Animals, ASLO Aquatic Sciences Meeting, Santa Fe  
1999 Gulf of Mexico GLOBEC Planning Workshop, LUMCON, Jan 13-15  
1999 National Science Foundation, Ocean Sciences Research Panel, Biological Oceanography, Spring 1999 Panel, Washington, D.C., May  
1999 Invited Course Instructor, Bermuda Biological Station for Research, Biological Oceanography (3 week course), May-June, 1999  
1999 Mississippi-Alabama Sea Grant, Scientific Program Development Workshop.  
1999-2000 Conference Organizer and Moderator, International Conference on Jellyfish Blooms, Gulf Shores, Alabama.  
2000 Reviewed and provided opinion on the 1999 shut down by jellyfish clogging of the Sual Power Plant in the Philippines for Southern Company, Birmingham.  
2001 Applicant Review Panel, DIALOG IV, July 2001, Washington DC

2001 Adriatic Sea, All-Scientists meeting, Rome, Italy, December 2001

2002 Environmental Protection Agency STAR Fellowship Panel, Washington , DC

2003 Biocomplexity Workshop on establishing Capstone Program for new PhD recipients in climate change (October)

2003 DIALOG V (Bermuda), mentor for new PhD recipients (October)

2004 COSEE Gulf of Mexico, Participant, Teacher Mentor

2004 Chair, Gelatinous Zooplankton Ecology Session, American Society for Limnology and Oceanography, Summer Meeting, Savannah, GA (June 2004)

2004 Attended ASLO Ocean Sciences Winter Meeting (Honolulu, HI)

2004 Hosted DIALOG VI meeting at DISL

2004 Workshop on Gelatinous Zooplankton Ecology in the Adriatic Sea (Participants Winter Meeting), Marine Biological Laboratory, Wood's Hole, MA (Dec 2004)

2005 LNG Monitoring Guideline meeting, New Orleans (August)

2005 Hosted DIALOG VII meeting at DISL, 3-10 December

2006- NMFS/DISL Cooperative Institute Science Steering Committee (produced short steering document)

2006- ADCNR-Sponsored Fisheries Oceanography in Coastal Alabama (FOCAL) Program Coordinator.

2006 Participated in Molecular Ecology Course (DISL, K. Bayha, Instructor)

2006 NOAA/NMFS SEAMAP Zooplankton Working Group Meeting, Ocean Springs, MS (December)

2007 Chair, Ecology Session, Second International Conference on Jellyfish Blooms, Gold Coast, Australia (June 2007)

2008 Review and Recommendations to Governor Riley on "Recommended baseline and operational monitoring plan for the TORP Bienville Offshore Energy Terminal (BOET) project" with ADCNR/MRD, USA Marine Sciences and DISL/FOCAL

2009 American Society of Limnology and Oceanography, Aquatic Sciences Meeting, Nice (France), *Session Co-Chair* with R. Condon and G. Gorsky. Implications of Gelatinous Zooplankton Blooms on Food-Web Dynamics and Nutrient Cycling.

2009 Panelist and Presenter at public forum on environmental issues sponsored by Baldwin County League of Women Voters. Gulf Shores, AL, 2009.

2009 Expert reviewer for the National Marine Fisheries Service, Revision of Critical Habitat for Leatherback Sea Turtles. Biological Report. Southwest Fisheries Science Center.

2009 Nominated Dr. Bill Hamner with successful outcome for AAUS Life-Time Achievement Award

2009 South Atlantic Climate Change Investigators meeting, Concepcion, Chile, (Oct)

2009 National Center for Ecological Analysis and Synthesis: Global Jellyfish Blooms Working Group, Santa Barbara

2009 National Center for Ecological Analysis and Synthesis: Communicating with Media and Policymakers Workshop, Santa Barbara

2010 National Center for Ecological Analysis and Synthesis: Oil Spill Working Group, Dauphin Island

b. Review Activities

National Science Foundation, Biological Oceanography Spring 1999 Review Panel (50 proposals reviewed)

National Science Foundation, International Programs  
National Science Foundation, Biological Oceanography Program  
National Science Foundation, GLOBEC George's Bank Initiative  
National Science Foundation, GLOBEC California Current Initiative  
National Science Foundation, ADVANCE Fellows Program  
Department of Energy, National Institute for Global Environmental Change  
California Sea Grant College  
Delaware Sea Grant  
Texas Sea Grant  
Mississippi-Alabama Sea Grant  
National Geographic Society  
Department of Energy, Global Environmental Change Program, Western region (WESTGEC)  
Coastal Oceans Program (CoOP), Northeast Pacific  
Coastal Oceans Program (CoOP), SE Fisheries Science  
Limnology and Oceanography  
Marine Ecology Progress Series  
Marine Biology  
Hydrobiologia  
Continental Shelf Research  
Gulf of Mexico Science  
Trends in Ecology and Evolution  
Scientia Marina  
Ecology  
Journal of the Marine Biological Association (U.K.)  
External reviewer for faculty promotion and tenure, University of Hawaii, Manoa  
Environmental Protection Agency STAR Fellowship Panel, Washington ,DC, Feb 2002  
Environmental Protection Agency STAR Fellowship Panel, Washington ,DC, Feb 2005  
Environmental Protection Agency STAR Fellowship Panel, Washington ,DC, Feb 2006  
Fisheries Oceanography  
Journal of Plankton Research  
Marine Biology Research  
Oceanography  
Bulletin of Marine Science  
Proceeding of the Royal Society (Biological Sciences)