

CURRICULUM VITAE: GEORGE MEREDITH BRANCH

2.1. Biographic sketch:

BORN: Salisbury, Zimbabwe, 25 September 1942. Married, two children.

UNIVERSITY EDUCATION:

University of Cape Town. B.Sc. 1963
Majors in Zoology and Botany, distinction in the former.
Class medals for best student in second and third year Zoology.
B.Sc. Hons. 1964. First class honours in Zoology
PhD 1973.

EMPLOYMENT:

Zoology department, University of Cape Town
Junior Lecturer, 1965-1966
Lecturer, 1967-1974
Ad hoc promotion to Senior Lecturer 1975
Ad hoc promotion to Associate Professor, 1979
Ad hom. promotion to Professorship 1985.
Student adviser, Life Sciences, 1975-1987
Postgraduate Summer Course, Friday Harbor Marine Laboratories, 1985.
Head of Department of Zoology, UCT, 1988-1990, 1994-1996
Chairman, School of Life Sciences, 1991
Chairman, Undergraduate Affairs, Zoology Department 1993

AWARDS:

Purcell Prize for best postgraduate biological thesis - 1965.
Fellowship of the University of Cape Town - 1983
Distinguished Teachers Award - 1984
UCT Book Award - 1986 - for "The Living Shores of Southern Africa".
Fellowship of the Royal Society of South Africa - 1990.
Appointed Director of FRD Coastal Ecology Unit -1991.
Awarded Gold Medal by Zoological Society of Southern Africa - 1992.
Awarded Gilchrist Gold Medal for contributions to marine science - 1994.
UCT Book Award - 1995 - for "Two Oceans - a Field Guide to the Marine Life of southern Africa" (Jointly awarded to CL Griffiths, ML Branch, LE Beckley.)
International Temperate Reefs Award for Lifetime Contributions to Marine Science – 2006.

FRD RATING AND FUNDING:

Rated in 1985 as qualifying for comprehensive support for funding from the Foundation for Research Development. Re-rated in 1990, 1994 and 1998 as category 'A' (scientists recognised as international leaders – approximately the top 4% of scientists in South Africa).

Funding from South African National Committee for Oceanographic Research:
1978-1983: Energy flow and dynamics of rocky shores.
1981-1985: The ecology and management of Bot River Estuary.

1984-1987: Dynamics of soft-sediment organisms in Langebaan Lagoon.
 1988-1989: Impact of sandsharks, flamingoes and bait-digging on lagoons.
 1988-1989: Harvesting of limpets: potential & ecological effects.
 1984-1986: Inshore community dynamics.
 1989-90: Trophodynamics of rock lobsters
 1989-90: Ecological consequences of Orange River floods.
 Funding by the South African Steering Committee for Antarctic Research for:
 1979-1982: Intertidal communities of Subantarctic Marion Island.
 1985-1991: Survey of the subtidal benthos of Marion Island.
 2001-2003: Bryozoa of Marion Island
 Funding from FRD and DEA:
 1990-2000: Joint venture on coastal conservation and exploitation.
 1995-2000: A national experimental approach managing intertidal resources.
 2001-present: Dynamics of near-shore ecosystems.
 Funding from Consolidated Diamond Mines and NamDeb:
 1994-1995: Impacts of diamond mining on inter- and subtidal communities
 Funding from SFRI (MCM)
 1994-1997: Rock-lobster diets
 1995-1996: Assessment of white mussel stocks.
 1998-1999: Assessment of rock-lobster sanctuaries.
 Funding from WWF:
 1995-2000: Co-management of mussel stocks in Natal.
 1999-2002: Co-management of intertidal and estuarine resources in Maputaland.
 Mellon Foundation:
 2002-2007: Comparative studies on the dynamics of rocky shores.

HOBBIES:

Scuba diving (qualified third class certificate and scientific diver's certificate); tennis;
 choral singing; photography - marine and wildlife photographs published in a variety
 of journals, magazines and books; three exhibitions of photographs of marine life.

COUNCILS AND COMMITTEES:

President, Conchological Society of Southern Africa, 1979-1984

Member of:

- Langebaan Ecological Committee 1978-1980
- Cape Estuarine Steering Committee 1980-81
- SANCOR Estuaries Programme Committee 1982-1990
- SANCOR Coastal Processes Committee, 1982-1989
- Council of Zoological Society of Southern Africa, 1974-1982
- UCT Conditions of Service Committee 1981-1982
- UCT Maintenance Grants Committee, 1983-1988
- UCT Distinguished Teachers Committee, 1988-89; 1992-96
- Chairman, Dolphin Working Group 1988-1989
- Committee for Coastal & Marine Systems, Council for Environment
- Chairman, Coastal Processes Steering Committee 1989-95.
- SANCOR Leadership Group 1993-97.
- Chairman, FRD Biodiversity Thrust, 1998-99.
- FRD evaluation committee, Animal Sciences, 1996, 2001.
- Chairman, Access Rights Technical Committee, 1996-97.
- Vice Chair, Subsistence Fishers Task Group, 1999-2001.
- Chair, NRF Evaluation committee. 2001

EDITORIAL WORK AND REFEREEING OF SCIENTIFIC PAPERS:

I have been an editor for the South African Journal of Zoology; guest editor for the Transactions of the Royal Society of South Africa and the SA Journal of Marine Science. I was on the editorial board of Environmental Conservation 1996-1999; I am on the international editorial board for the African Journal of Marine Science, and have refereed papers for the following journals: Transactions of the Royal Society of Southern Africa; Journal of Experimental Marine Biology and Ecology; Australian Journal of Marine and Freshwater Research; Aquaculture; Invertebrate Pathology; Journal of Paleontology; Veliger; Zoologica Africana; Marine Ecology Progress Series; Comparative Biochemistry and Physiology; Annals of the South African Museum; South African Journal of Marine Science; South African Journal of Science; Paleobiology; Ecology; Ecological Monographs; Ecological Applications; Science; Journal of Invertebrate reproduction; Japanese Journal of Physiology; Oecologia; J. Reproduction; Ecoscience; Marine Biology; Conservation Biology; Biological Conservation; Environmental Conservation; Australian J. Zoology; Evolution; Canadian J. Zoology; J. Coastal Conservation; Marine and Freshwater Research; African Zoology; Malacology; Annual Review of Oceanography and Marine Biology; Aquaculture; Bulletin of the Malacological Society of London; J. of Negative Results; Aquatic Living Resources; J Coastal Management; Biological Invasions; Proceedings of the National Academy of Sciences; Fisheries Research, Ecological Letters

2.2 TANGIBLE RESEARCH OUTPUTS: PUBLICATIONS

1. BRANCH, G.M. 1966. Functional morphology of fishes, Pt. III. The cranial morphology of *Syngnathus acus*. Zool. Afr. 2: 69-89.
2. BRANCH, G.M. 1971. The ecology of *Patella* Linnaeus from the Cape Peninsula, South Africa. I. Zonation, movements and feeding. Zool. Afr. 6: 1-38.
3. BRANCH, G.M. 1974a. The ecology of *Patella* Linnaeus from the Cape Peninsula, South Africa II. Reproductive cycles. Trans. roy. Soc. S. Afr. 41: 111-160.
4. BRANCH, G.M. 1974b. The ecology of *Patella* Linnaeus from the Cape Peninsula, South Africa III. Growth rates. Trans. roy. Soc. S. Afr. 41: 161-193.
5. BRANCH, G.M. 1974c. A new species of harpacticoid copepod commensal with *Patella*, with a description of its life cycle. Crustaceana 26: 179-200.
6. BRANCH, G.M. 1975a. A new species and records of *Scutellidium* (Harpacticoidea, Copepoda) from South Africa, and a world key to the genus. Ann. S. Afr. Mus. 66: 221-232.
7. BRANCH, G.M. 1975b. Intraspecific competition in *Patella cochlear* Born. J. anim. Ecol. 44: 263-282.
8. BRANCH, G.M. 1975c. Mechanisms reducing intraspecific competition in *Patella* spp: migration, differentiation and territorial behaviour. J. anim. Ecol. 44: 575-600.
9. BRANCH, G.M. 1975d. The ecology of *Patella* from the Cape Peninsula, South Africa. IV Desiccation. Mar. Biol. 32: 179-188.
10. BRANCH, G.M. 1975e. The ecology of *Patella* from the Cape Peninsula, South Africa. V. Commensalism. Zool. afr. 10: 133-162.
11. BRANCH, G.M. 1975f. Notes on the ecology of *Patella concolor* and *Cellana capensis*, and the effects of human consumption on limpet populations. Zool. Afr. 10: 75-85.
12. BRANCH, G.M. 1976a. Interspecific competition experienced by South African *Patella* spp. J. anim. Ecol. 45: 507-529.
13. BRANCH, G.M. 1976b. Notes on the conservation of Umgazana estuary. S. Afr. J. Sci. 72: 363-364. (Abstract only).
14. BRANCH, G.M. & MARSH, A. 1978. Attachment forces and shell shape in *Patella*:

- adaptive strategies. *J. exp. mar. Biol. Ecol.* 34: 111-130.
15. BRANCH, G.M. & NEWELL, R.C. 1978. A comparative study of metabolic energy expenditure in the limpets *Patella cochlear*, *P. oculus* and *P. granularis*. *Mar. Biol.* 49: 351-361.
 16. BRANCH, G.M. 1978. The responses of South African patellid limpets to invertebrate predators. *Zool. afr.* 13: 221-232.
 17. MAZURE, H. G.F. & BRANCH, G.M. 1979. A preliminary analysis of bacterial numbers and biomass in Langebaan lagoon. *Trans. roy. Soc. S. Afr.* 44: 43-54.
 18. MARSH, B.A. & BRANCH, G.M. 1979. Circadian and circatidal rhythms in the sandy-beach isopod, *Tylos granulatus* Krauss. *J. exp. mar. Biol. Ecol.* 37: 77-90.
 19. McQUAID, C.D., BRANCH, G.M. & FROST, P.G.H. 1979. Thermal stress in the semi-arid terrestrial snail, *Theba pisana*. *Thermal Biol.* 4: 47-55.
 20. BRANCH, G.M. 1979a. Respiratory adaptations in the limpet *Patella granatina*, and a comparison with other limpets. *Comp. Biochem. Physiol.* 62A: 641-647.
 21. BRANCH, G.M. 1979b. Aggression by limpets against invertebrate predators. *Anim. Behaviour.* 27: 408-410.
 22. BRANCH, G.M. 1979c. Food as a limiting resource for intertidal herbivores. *S. Afr. J. Sci.* 75: 562. (Abstract only).
 23. BRANCH, G.M. & GRINDLEY, J. 1979. The ecology of southern African estuaries XI. Mngazana, a mangrove estuary in Transkei. *S. Afr. J. Zool.* 14: 149-170.
 24. BRANCH, G.M., NEWELL, R.C. & BROWN, A.C. 1979. Metabolic energy expenditure: adaptations in intertidal organisms. *S. Afr. J. Sci.* 75: 567-568. (Abstract only).
 25. NEWELL, R.C. & BRANCH, G.M. 1980. The influence of temperature on the maintenance of metabolic energy balance in marine invertebrates. *Advances in marine Biology.* 17: 329-396.
 26. BRANCH, G.M. & BRANCH, M.L. 1980. Competition between *Cellana tramoserica* (Sowerby) (Gastropoda) and *Patriella exigua* (Lamarck) (Asteroidea), and their influence on algal standing stocks. *J. exp. mar. Biol. Ecol.* 48: 35-49.
 27. BRANCH, G.M. & BRANCH, M.L. 1980. Competition in *Bembicium auratum* (Gastropoda) and its effect on microalgal standing stock in mangrove muds. *Oecologia* 46: 106-114.
 28. BRANCH, G.M. 1980. Territoriality in limpets: manipulative experiments and energy budgets. *J. malacol Soc. Aust.* 4: 245-246. (abstract only)
 29. BRANCH, G.M. & BRANCH, M.L. 1981. Experimental analysis of intraspecific competition in an intertidal gastropod, *Littorina unifasciata*. *Aust. J. Mar. Freshwater Res.* 32: 573-589.
 30. BRANCH, G.M. 1981. The biology of limpets: physical factors, energy flow, and ecological interactions. *Oceanogr. Mar. Biol. Ann. Rev.* 19: 235-380.
 31. BRANCH, G.M. & BRANCH, M.L. 1981. *The Living Shores of Southern Africa*. C. Struik, Cape Town. 272pp.
 32. HOCKEY, P.A.R. & BRANCH, G.M. 1983. Do Oystercatchers influence limpet shape? *Veliger* 26: 139-141.
 33. JOSKA, M.A.P. & BRANCH, G.M. 1983. The reproductive cycle of the trochid gastropod *Oxystele variegata* (Anton, 1839). *Veliger* 26: 47-51.
 34. HOCKEY, P.A.R. & BRANCH, G.M. 1984. Oystercatchers and limpets; impact and implications. A preliminary assessment. *Ardea* 72: 199-206.
 35. BLANKLEY, W.O. & BRANCH, G.M. 1984. Cooperative prey capture and unusual brooding habits of *Anasterias rupicola* (Verrill) (Asteroidea) at Sub-Antarctic Marion Island. *Mar. Ecol. Prog. Ser.* 20: 171-176.
 36. BRANCH, G.M. 1984a. Competition between marine organisms:

- ecological and evolutionary implications. *Oceanogr. Mar. Biol. Ann. Rev.* 22: 429-593.
37. BRANCH, G.M. 1984b. Changes in populations of intertidal and shallow water communities in South Africa during the 1982-83 temperature anomaly. *S. Afr. J. Sci.* 80: 61-65.
 38. BRANCH, G.M. & DAY, J.A. 1984. Ecology of southern African estuaries: Pt XIII. The Palmiet River Estuary in the south-western Cape. *S. Afr. J. Zool.* 19: 63-77.
 39. BERNHEIMER, A.W., AVAGID, L.S., BRANCH, G.M. & DOWDLE, E. 1984. Purification and properties of a toxin from a South African sea anemone, *Pseudactinia varia*. *Toxicon* 22: 183-191.
 40. McQUAID, C.D. & BRANCH, G.M. 1984. The influence of sea temperature, substratum and wave action on rocky intertidal communities: an analysis of faunal and floral biomass. *Mar. Ecol. Prog. Ser.* 19: 145-151.
 41. McQUAID, C.D. & BRANCH, G.M. 1985. Trophic structure of rocky intertidal communities: response to wave action and implications for energy flow. *Mar. Ecol. Prog. Ser.* 22: 153-161.
 42. McQUAID, C.D., BRANCH, G.M. & CROWE, A.A. 1985. Biotic and abiotic influences on rocky intertidal biomass and richness in the southern Benguela region. *S. Afr. J. Zool.* 20: 115-122.
 43. BRANCH, G.M. 1985a. Competition: its role in ecology and evolution in intertidal communities. In: *Species and Speciation* (ed. Vrba, E.S.) Transvaal Mus. monogr. 4: 97-104.
 44. BRANCH, G.M. 1985b. The impact of predation by Kelp Gulls *Larus dominicanus* on the Sub-Antarctic limpet *Nacella delesserti*. *Polar Biol.* 4: 171-177.
 45. BRANCH, G.M. 1985c. Limpets: evolution and adaptation. In: E.R. Trueman and M.R. Clarke (eds) *The Mollusca*, Vol. 10. Academic Press. pp. 187-220.
 46. BRANCH, G.M. 1985d. Limpets: their role in littoral and sublittoral community dynamics. In: P.G. Moore & R. Seed (eds) *The Ecology of Rocky Coasts*. Hodder & Stoughton Educational. pp.97-116.
 47. ROBERTS, C.H., BRANCH, G.M. & ROBB, F.T. 1985a. The effect of salinity and temperature variations on the bacterial populations in the Bot River Estuary. *Trans. roy. Soc. S. Afr.* 45: 347-352.
 48. ROBERTS, C.H., BRANCH, G.M. & ROBB, F.T. 1985b. The annual cycle of free-floating bacteria in the Bot River Estuary. *Trans. roy. Soc. S. Afr.* 45: 353-362.
 49. BENNETT, B.A., HAMMAN, K.C.D., BRANCH, G.M. & THORNE, S.C. 1985. Changes in the fish fauna of the Bot River Estuary in relation to opening and closure of the estuary mouth. *Trans. roy. Soc. S. Afr.* 45: 449-464.
 50. BRANCH, G.M. et al. 1985. Synopsis of the impact of artificially opening the mouth of the Bot River Estuary: implications for management. *Trans. roy. Soc. S. Afr.* 45: 465-483.
 51. BLANKLEY, W.O. & BRANCH, G.M. 1985. The ecology of the limpet *Nacella delesserti* (Philippi) at Marion Island in the sub-Antarctic southern ocean. *J. exp. mar. Biol. Ecol.* 92: 259-281.
 52. GRAHAME, J. & BRANCH, G.M. 1985. Reproductive patterns of marine invertebrates. *Oceanogr. Mar. Biol. Ann. Rev.* 23: 373-398.
 53. BRANCH, G.M. & CHERRY, M.I. 1985. Activity rhythms of the

- pulmonate limpet *Siphonaria capensis* Q. & G. as an adaptation to osmotic stress, predation and wave action. *J. exp. mar. Biol. Ecol.* 87: 153-168.
54. BOSMAN, A.L., DU TOIT, J.T., HOCKEY, P.A.R. and G.M. BRANCH 1986. A field experiment demonstrating the influence of seabird guano on intertidal primary production. *Est. Coastal Shelf Sci.* 23: 283-294.
 55. BRANCH, G.M. & PRINGLE, A. 1987. The impact of the sand prawn *Callinassa kraussi* Stebbing on sediment turnover and on bacteria, microfauna and benthic diatoms. *J. exp. mar Biol. Ecol.* 107: 219-235.
 56. BRANCH, G.M., BARKAI, A., HOCKEY, P.A.R. & HUTCHINGS, L. 1987. Biological interactions : causes or effects of variability in the Benguela Ecosystem? *S. Afr. J. mar. Sci.* 5: 425-445.
 57. BRANCH, G.M. & GRIFFITHS, C.L. 1988. The Benguela ecosystem Pt V. The coastal zone. *Oceanogr. Mar. Biol. Ann. Rev.* 26: 395-486.
 58. BRANCH, G.M., BOUCHERS, P., BROWN, C.R. & DONNELLY, D. 1988. Temperature and food as factors influencing oxygen consumption of intertidal organisms, particularly limpets. *Am. Zool.* 28(1):137-146.
 59. BRANCH, G.M. 1988. Activity rhythms of the pulmonate limpet *Siphonaria thersites*. In: Chelazzi G. & Vannini M (eds) *Behavioural Adaptation to Intertidal Life.* pp 27-44. Plenum Press, New York.
 60. BRANCH, G.M. & BARKAI, A. 1988. Interspecific behaviour and its reciprocal interaction with evolution, population dynamics and community structure. In: Chelazzi, G and Vannini, M (eds). *Behavioural Adaptation to Intertidal Life.* pp 225-254. Plenum Press, New York.
 61. HARRIS, S.A., BENNETT, B.A. & BRANCH, G.M. 1988. An assessment of the role of the sandshark *Rhinobatis annulatus* as a predator in Langebaan Lagoon. *S. Afr. J. Mar. Sci.* 7: 153-159.
 62. BARKAI, A. & BRANCH, G.M., 1988. Contrasts between the benthic communities of subtidal hard substrata at Marcus and Malgas Islands: a case of alternative stable states? *S. Afr. J. mar. Sci.* 7: 117-137.
 63. BARKAI, A. & BRANCH, G.M., 1988. The influence of predation and substratal complexity on recruitment to settlement plates: a test of the theory of alternative states. *J. exp. mar. Biol. Ecol.* 124: 215-237.
 64. BARKAI, A. & BRANCH, G.M., 1988. Energy requirements for dense population of rock lobsters *Jasus lalandii*: novel importance of unorthodox food sources. *Mar. Ecol. Prog. Ser.* 50: 83-96.
 65. FIELDING, P.J., DAMSTRA, K. St. J. & BRANCH, G.M. 1988. Benthic diatom biomass, production and sediment chlorophyll in Langebaan Lagoon, South Africa. *Estuar. Coastal Shelf. Sci.* 27: 413-426.
 66. APPLETON, C.C. & BRANCH, G.M. 1989. Upstream migration by the invasive snail, *Physa acuta*, in Cape Town, South Africa. *S. Afr. J. Sci.* 85: 189-190.
 67. Whitfield, A.K., Beckley, L.E., Bennett, B.A., Branch, G.M., Kok, H.M., Potter, I.C., van der Elst, R.P., 1989. Composition, species richness and similarity of ichthyofaunas in eelgrass *Zostera capensis* beds of southern Africa. *S. Afr. J. Mar. Sci.* 8, 251-259.
 68. TUGWELL, S. & BRANCH, G.M. 1989. Differential polyphenolic distribution among tissues in the kelps *Ecklonia maxima*, *Laminaria pallida* and *Macrocystis angustifolia*. in relation to plant-defence theory. *J. Exp. Mar. Biol. Ecol.* 129: 219-230.

69. BRANCH, G.M., EEKHOUT, S. & BOSMAN, A.L. 1990. Short-term effects of the Orange River floods on the intertidal rocky-shore communities of the open coast. *Trans. roy. Soc. S. Afr.* 47:331-354.
70. LE ROUX, P., BRANCH, G.M. & JOSKA, M.A.P. 1990. On the distribution, diet and possible impact of the invasive European shore crab *Carcinus maenas* (L.) along the South African coast. *S. Afr. J. Mar. Sci.* 9:85-93.
71. HENCHEL, J.R., COOK, P.A. & BRANCH, G.M. 1990. The colonisation of artificial substrata by marine sessile organisms in False Bay. 1. Community development. *S. Afr. J. Mar. Sci.* 9: 289-297.
72. HENCHEL, J.R., BRANCH, G.M. & COOK, P.A. 1990. The colonisation of artificial substrata by marine sessile organisms in False Bay. 2. Substratal material. *S. Afr. J. Mar. Sci.* 9: 299-307.
73. BENNETT, B.A. & BRANCH, G.M. 1990. Relationships between production and consumption of prey species by resident fish in the Bot, a cool temperate South African estuary. *Estuar. coastal Shelf Sci.* 31:139-155.
74. GRIFFITHS, C.L. & BRANCH, G.M. 1991. The macrofauna of rocky shores in False Bay. *Trans. Roy. Soc. S. Afr.* 47: 575-594.
75. WYNBERG, R.P. & BRANCH, G.M., 1991. An assessment of bait-collecting for *Callinassa kraussi* Stebbing in Langebaan Lagoon, and of associated avian predation. *S. Afr. J. mar. Sci.* 11: 141-152.
76. EMANUEL, B.P., BUSTAMANTE, R.H., BRANCH, G.M., EEKHOUT, S & ODENDAAL, F.J., 1992. A zoogeographic and functional approach to the selection of marine reserves on the west coast of South Africa. *S. Afr. J. mar. Sci.* 12: 341-354.
77. TUGWELL, S. & BRANCH, G.M. 1992 Effects of gut surfactants on kelp polyphenol defences. *Ecology* 73: 205-215.
78. COHEN, A.L. & BRANCH, G.M. 1992. Environmentally controlled variation in the structure and mineralogy of *Patella granularis* shells from the coast of South Africa: implications for palaeotemperature assessments. *Palaogeography, Palaeoclimatology, Palaeoecology* 91: 49-57.
79. BRANCH, G.M., HARRIS, J.M., PARKINS, C. BUSTAMANTE, R.H. & EEKHOUT, S. 1992 Algal "gardening" by grazers: a comparison of the ecological effects of territorial fish and limpets. *In* *Plant-Animal Interaction in the Marine Benthos*. (eds. D.M. John, S.J. Hawkins & J.H. Price). Systematics Association Special Volume, No. 46, pp. 405-423. Clarendon Press, Oxford.
80. BECKLEY, L.E. & BRANCH, G.M. 1992 A quantitative scuba-diving survey of the sublittoral macrobenthos at subantarctic Marion Island. *Polar Biol.* 11: 553-563.
81. EEKHOUT, S., RAUBENHEIMER, C.M., BRANCH, G.M., BOSMAN, A.L. & BERGH, M.O., 1992. A holistic approach to the exploitation of intertidal stocks: limpets as a case history. *S. Afr. J. mar. Sci.* 12: 1017-1029.
82. BRANCH, G.M., ATTWOOD, C., BRANCH, M.L. & GIANAKOURAS, D., 1993. Patterns in the benthic communities on the shelf of the subantarctic Prince Edward Islands. *Polar Biol.* 13: 23-34.
83. BRANCH, G.M., GRIFFITHS, C.L., BRANCH, M.L., & BECKLEY, L.E. 1994. *Two Oceans. A Guide to the Marine Life of southern Africa*. D Philip Publishers, Cape Town. 360pp.
84. SIEGFRIED, W.R, HOCKEY, P.A.R. & BRANCH, G.M., 1994. The exploitation of intertidal and subtidal biotic resources of rocky shores in Chile and South Africa - an overview. *In: Rocky Shores: Exploitation in*

- Chile and South Africa (ed. R.W. Siegfried). Springer-Verlag. Ecological Studies. pp 1-15.
85. BRANCH, G.M., & MORENO, C.A., 1994. Intertidal and subtidal grazers. In: Rocky Shores: Exploitation in Chile and South Africa. (ed. R.W. Siegfried). Springer-Verlag. Ecological Studies. pp 75-100.
 86. CASTILLA, J.C., BRANCH, G.M. & BARKAI, A. 1994. Exploitation of two critical predators: the gastropod *Concholepas concholepas* and the rock lobster *Jasus lalandii*. In: Rocky Shores: Exploitation in Chile and South Africa. (ed. R.W. Siegfried). Springer-Verlag. Ecological Studies. pp 101-130.
 87. DYE, A.H., BRANCH, G.M., CASTILLA, J.C. & BENNETT, B.A., 1994. Biological options for the management of the exploitation of intertidal and subtidal resources. In: Rocky Shores: Exploitation in Chile and South Africa. (ed. R.W. Siegfried). Springer-Verlag. Ecological Studies. pp. 131-153.
 88. ODENDAAL, F.J., BERGH, M.O. & BRANCH, G.M., 1994. Socio-economic options for the management of the exploitation of intertidal and subtidal resources. In: Rocky Shores: Exploitation in Chile and South Africa. (ed. R.W. Siegfried). Springer-Verlag. Ecological Studies. pp. 155-167.
 89. WYNBERG, R.P. & BRANCH, G.M. 1994. Disturbance associated with bait-collecting for sandprawns (*Callinassa kraussi*) and mudprawns (*Upogebia africana*): long-term effects on the biota of intertidal sandflats. *J. Mar. Res.* 52: 1-35.
 90. BUSTAMANTE, R.H., GETZ, W.M., & BRANCH, G.M. 1994. Analysis of a limpet fishery using a metaphysiological stand-growth model. *Natural Resource Modelling* 8: 139-161.
 91. HOCKEY, P.A.R. & BRANCH, G.M. 1994. Conserving marine biodiversity on the African coast: implications of a terrestrial perspective. *Aquatic Conservation: Marine and Freshwater Ecosystems* 4: 345-363.
 92. RIEGL, B, SCHLEYER, MH, COOK, PA & BRANCH, GM. 1995. The structure of Africa's southernmost coral community. *Bull. Mar. Sci.* 56: 676-691.
 93. RIEGL, B & BRANCH, GM 1995. Influence of sedimentation on the energy budgets of four hard- and five soft-coral species. *J. exp. mar. Biol. Ecol.* 186: 259-275.
 94. BUSTAMANTE, RH, BRANCH, GM, EEKHOUT, S, ROBERTSON, B, ZOUTENDYK, P, SCHLEYER, M, DYE, A, KEATS, D, JURD, M, & MCQUAID, CD 1995. Gradients of intertidal productivity around the coast of South Africa and their relationship with consumer biomass. *Oecologia.* 102: 189-201.
 95. BUSTAMANTE, RH, BRANCH, GM & EEKHOUT, S. 1995. Maintenance of an exceptional grazer biomass in South Africa: subsidy by subtidal kelps. *Ecology.* 76: 2314-2329.
 96. BRANCH, G.M. 1996. The theory of evolution: a review of its current scientific status. In: *Nature, God and Humanity*. (Ed. C.W. du Toit). Proceedings of the third seminar of the South African Science and Religion Forum (SASRF) of the Research Institute for Theology and Religion, UNISA 1-2 June 1995. pp 210-225.
 97. BUSTAMANTE, RH & BRANCH GM 1996a. Large scale patterns and trophic structure of southern African rocky shores: the roles of geographic variation and wave exposure. *J. Biogeog.* 23: 339-351.

98. BUSTAMANTE, RH & BRANCH, GM. 1996b. The dependence of intertidal consumers on kelp-derived organic matter on the west coast of South Africa. *J. exp. mar. Biol. Ecol.* 196: 1-28.
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RESEARCH ACCOMPLISHED, ESPECIALLY 1992-2007.

The nature and emphasis of my research has changed over the past five-ten years. After an early flirtation with fish morphology and copepod taxonomy, I am no longer involved with these fields. My involvement with sub-

Antarctic research (1980-1990) has also ceased, although several papers have appeared since then (Beckley & Branch, 1992; Branch et al. 1993 - and 8 others by my wife, who completed an MSc dealing with the taxonomy of benthic invertebrates and is currently working on the Bryozoa of Marion Island). My interest in estuarine ecology and management has become more focussed on the question of the role of species such as *Callianassa*, which dominate intertidal sandflats because of their bioturbation. I have focused on an expansion of my work on limpets, which have so richly rewarded me, and have broadened my interests to aspects of the management, dynamics and evolution of rocky-shore organisms and ecosystems.

I have also shifted into two new fields. First, I have become involved with species of commercial interest, choosing to work at the interface between applied and pure sciences on topics that hold scientific interest while falling outside the function of the authorities responsible for their management. Second, I have invested a good deal of research on policies for the management, conservation and harvesting of marine resources. The way in which I operate has also changed. I am privileged to have a strong group of postgraduate students, and collaborate closely with them. Indeed, my own research depends vitally upon them, as is reflected by my increasing number of co-authored papers. The achievements of the group extend far beyond those I could accomplish on my own.

I also believe it is important to communicate scientific findings to the public and to politicians, and my group has written 15 popular articles and contributed to 18 TV documentaries and 22 radio interviews. In 1981, my wife and I wrote 'The Living Shores of Southern Africa', which became a non-fiction best-seller, was awarded the UCT book award, and has been in continuous print for 21 years. This was followed in 1994 by 'Two Oceans - A Guide to Marine Life in Southern Africa', (co-authored with CL Griffiths, ML Branch & LE Beckley), which was also awarded the UCT book award and in 2002 was revised and published as a 5th Impression.

1. Ecology of the patellid limpets: 1971-present:

Central to much of my research has been the biology of limpets, although I have broadened from considering them autecologically to investigating their role and interactions in rocky-shore systems. Many of my most interesting discoveries have only been possible because of an intimate knowledge of these organisms. My early work concentrated on their general biology, growth rates and reproductive patterns, adaptations to desiccation, wave action, commensal associations, parasitism, and their activity rhythms and responses to predators (Branch, 1978, 1979b, 1985b, 1988, Branch & Branch, 1980a, Blankley & Branch, 1985, Branch & Marsh 1978, Hockey & Branch, 1983, 1984, Branch & Cherry, 1985, Branch, 1988). As a result of my interest in limpets I was asked to write a review on them (Branch, 1981). This did a good deal to establish my name internationally (and remains my most-cited paper), and was followed by invitations to contribute chapters on the evolutionary adaptations of limpets (Branch, 1985c) and their ecological role (Branch, 1985d). In all, I have published 44 papers relating to the biology of limpets.

Over the past five years I have concentrated on three aspects: (1) The phylogenetic relationships of patellid limpets and their significance in explaining patterns of behaviour. (2) The role of limpets in intertidal communities, especially on the west coast of southern Africa, where they attain almost unbelievably high biomasses. (3) The management of limpet stocks on the west coast, where they have been targeted for commercial exploitation.

Of great interest to me has been the light that limpets may throw on competitive interactions (Branch, 1975b,c, 1980, Branch & Branch, 1980a) and the manner in which competition may mould the nature of species. My early work showed that the average specialisation of South African limpets increases as the number of co-existing species rises. I hypothesised that competition acts as a 'sieve' at the time when new species are developing, rather than subsequently modifying their nature. The evidence I accumulated in support of this hypothesis is, I believe, a significant contribution to understanding the process of competition in an evolutionary context (Branch, 1985a). Much of my recent work has tested aspects of this hypothesis and explored alternative, competing hypotheses. Several South African limpets exhibit a specialised 'gardening' behaviour, territorially defending particular species of algae against other grazers and enhancing their productivity. I have argued that whereas fish maintain highly productive gardens by reducing grazing compared with background levels, limpets act in an opposite manner, increasing grazing pressure in their localized territories, thus maintaining fast-growing nutritious algae (Branch et al., 1992). I would rate this as one of my more significant recent papers because it generate new ways of thinking about territoriality, which extend well beyond the marine world. We have since demonstrated a negative correlation between productivity and the frequency of territoriality in limpets: territoriality has only been developed by limpets in areas of low productivity but stable food supplies (Bustamante et al., 1995).

Another possibility is that territoriality is rooted in phylogeny. Stimulated by research with D. Lindberg (Berkeley) on the phylogenetic significance of shell microstructure, I teamed up with S. Ridgway (then British Museum of Natural History, now Munich National Museum) and A. Hodgson (Rhodes) to explore the evolutionary relationships of the world's patellid limpets (Hodgson et al. 1996; Ridgway et al., 1998). This work was multi-disciplinary, drawing on anatomy, sperm structure, radular features and shell microstructure. The results reveal four major groups, with distinctively different biogeographic patterns. One is Indo-Pacific and has a high incidence of territorial species. The other three groups (one South African, the others mainly Atlantic) have but a single species that is territorial. Thus, territoriality is restricted by phylogeny.

As a by-product of my interest in shell microstructure, Anne Cohen and I developed a palaeothermometer, using calcite:aragonite ratios and oxygen isotope analyses of modern and ancient limpet shells (Cohen & Branch, 1992). This provided the first demonstration of three recent episodes of oceanic cooling in the southern hemisphere, and threw light on the correlations between different shell microstructures and sea temperature.

Some of the limpets that achieve high densities and biomasses are 'gardeners', and this behaviour enhances local production sufficiently to explain how they maintain their populations. Prof. R. Steneck (Maine, USA) and I worked on the coexistence of a coralline algae, *Spongites yendoi*, with dense stands of the territorial limpet *Patella cochlear*. We have shown that a thick coralline (*Spongites impar*) is competitively superior to the thinner, fast-growing *S. yendoi*, but is intolerant of grazing and thus confined to a zone above *P. cochlear*. Plaganyi and Branch (2000) showed that the limpet *Patella cochlear* enhances the productivity of its territorial gardens due to fertilization by its excreta.

Patella granatina and *P. argenvillei* achieve extraordinarily high biomasses on the west coast of South Africa (higher than that recorded for any other grazer). Our work has shown that they trap drift or live kelp, and that this 'subsidy' of the intertidal system is vital to sustain them (Bustamante, Branch & Eekhout, 1995). This work is relevant to current ecological debate, including the issue of bottom-up v. top-down controls.

2. Ecology and management of estuaries: 1978-present:

Much of my early work on estuaries concerned the possible creation of estuarine sanctuaries (Branch & Grindley, 1979), the management of freshwater inputs (Branch & Day, 1984) and the regulation of mouth breaching. I led a five-year programme on the ecology of the Bot River Estuary, which involved 5 institutes and 9 research scientists and yielded 25 papers (summarised in Branch et al., 1985). One outcome was a quantification of the productivity of the system in relation to consumption and diets of fish. This showed that the dietary specialisation of fish was directly related to their abundance (Bennett & Branch, 1990), a result of general interest because it contradicts commonly-held views on competitive processes.

This research led to an interest in the dynamics of estuarine organisms (Branch & Branch, 1980b). The most significant (and most-cited!) work concerns the impact of sand-prawns (*Callinassa kraussi*) on the estuarine community; our study was the first to show that *Callinassa* radically modifies production by benthic diatoms, reduces meiofaunal densities and increases bacterial standing stocks by a factor of three (Branch & Pringle, 1987). This line of research has been pursued for other estuarine species, including mud snails, hermit crabs, bloodworms and flamingos, all of which perturb sediments, although in different ways. An M.Sc. student of mine, D. Glassom, showed that flamingos profoundly influence the macrofauna, meiofauna, bacteria and diatoms of sandflats (Glassom & Branch, 1997a,b). Work on the harvesting of sand-prawns for bait has revealed that the simple action of trampling, which is inevitably associated with bait-collecting, has detrimental effects almost as great as bait-collecting itself, apparently because it causes collapse of the sandprawns burrows (Wynberg & Branch 1997). Other macrofaunal species also suffer in the process, and take almost two years to recover (Wynberg & Branch, 1991, 1994). The importance of trampling per se, as distinct from bait collecting (Wynberg & Branch, 1997), has profound implications for management procedures in estuarine conservation areas.

More recent work has concentrated on interactions between sandprawns, mudprawns and eelgrass. An MSc thesis by Timony Siebert has demonstrated that eelgrass consolidates sediment and excluded sandprawns while favouring mudprawns, whereas sandprawns destabilise the sediment and exclude eelgrass. The practical implications of these interactions and the effects of human harvesting are being pursued by another MSc student, Pierre Nel. As an exciting spinoff, yet another MSc student, Andrea Angel, unravelled the causes of rarity and habitat restriction of an endemic and threatened limpet, *Siphonia compressa*, which occurs solely on eelgrass in Langebaan Lagoon.

3. Intertidal and inshore ecology: 1975-present:

From my interests in the ecology of limpets sprang a much broader curiosity about the functioning of intertidal and shallow-water ecosystems, including an ongoing interest in the relative importance of competition in structuring marine assemblages (reviewed in Branch, 1984a, 1985b). Notable conclusions are that interference competition is more prevalent than exploitative competition, which compels a rethink about much competition theory; and that the mobility of species and the nature of their resources strongly influence the outcome of competition.

Our early work showed that the proportions of different trophic groups on rocky shores reflect the amount of wave action experienced. Exposed shores have a high biomass, are dominated by filter-feeders, and are net importers of energy; sheltered shores have low biomass, proportionally greater contributions by grazers and algae, and are net exporters (McQuaid & Branch, 1984, 1985, McQuaid, Branch & Crowe, 1985). This work was greatly expanded by a survey around the entire southern African coast between 1990 and 1992. This confirmed that filter-feeders dominate wave-exposed shores everywhere in southern Africa (Bustamante & Branch 1996). More interestingly, it showed up striking differences in community structure, which are related to a decline in productivity as one moves from the west to the east coast (Bustamante et al. 1995). In particular, the biomass of grazers is exceptionally high on the west coast, and correlated with productivity. Productivity is also inversely related to species richness and endemism (Hockey & Branch, 1994). These circumstances open an ideal opportunity to test current ideas about the role of diversity, including questions about species "redundancy".

This research was coupled with coast-wide annual measurements of primary production (Branch et al. 1992), and detailed work on the underlying explanations for the high west-coast grazer biomasses. In short, *in situ* production is incapable of supporting more than about 50% of the recorded biomass. However, by trapping living or drift kelp, two of the dominant grazers can double their potential standing stock (Bustamante, Branch & Eekhout, 1995). Using isotopic ratios, we also showed that west-coast filterfeeders derive 60-80% of their food from particulate kelp. Of greater general interest is the finding that wave action enhances both the concentration and the turnover of food for filterfeeders, and that this effect may, on its own, account for the recorded differences in filterfeeder biomass on sheltered versus wave-exposed shores (Bustamante & Branch, 1996). This is an important outcome, for it is the first quantitative demonstration of this effect.

Our earlier work on anti-herbivore adaptations in kelps (Tugwell & Branch, 1989) has now been taken further. Others have shown that surfactants are universally present in the guts of herbivores and may nullify the effects of polyphenols. Because of this, it has been argued that polyphenols are incapable of repelling herbivores. However, our work shows that this is true only for species that specialise on polyphenol-laden algae such as kelps. Surfactants from generalised herbivores are ineffective as a counter to polyphenols, and they avoid such algae (Tugwell & Branch, 1992). The limpet *Patella longicosta* occupies 'gardens' of the alga *Ralfsia*, which contains extremely high levels of polyphenols. We now know that grazing by the limpet increases the growth rate of the algae, leading to a decline in the polyphenol level and a concomitant reduction in the rate at which the limpet eats the alga. This gives the impression of 'prudent predation' (Branch et al., 1992).

Our research on coastal and inshore ecology was expanded in 1986 when comprehensive funding was granted by the FRD for a team project led by myself, Prof J.G. Field and Assoc Prof C.L. Griffiths. In 1990 this project supported four Ph.D. students and six M.Sc. students. By the beginning of 1996 the numbers had grown to 14 Ph.D. and 18 M.Sc. students. Over the period 1988-96 this work yielded 44 papers authored or co-authored by myself and a further 148 by my co-leaders and our students. Several review articles summarise the work (Branch et al. 1987; Branch & Griffiths, 1988; Branch & Barkai, 1988; Branch et al., 1992). In addition, a book was published which summarises much of this work and makes comparisons between South Africa and Chile. I contributed five chapters (Siegfried, Hockey & Branch, 1994; Castilla, Branch & Barkai, 1994; Dye, Branch, Castilla & Bennett, 1994; Branch & Moreno, 1994). Our research group has also published the first field guide to marine life in southern Africa, covering all major groups of animals and plants (Branch, Griffiths, Branch & Beckley, 1994), and this received the UCT Book Award in 1995. In the last 5 years I have benefited enormously from an grant from the Andrew Mellon Foundation, which opened new doors of research into the effects of upwelling on coastal ecosystems and has yielded a rich set of papers on community dynamics. Much of this work is summarised in a chapter by Menge and Branch (2001).

Other studies on coastal invertebrates include 12 papers by Riegl on coral reef biology and management; the hydrodynamic role of funnel shapes in corals (Riegl, Heine & Branch 1996); the effects of an oil spill (Glassom, Prochazka and Branch 1997); a mass mortality of a space-dominating ascidian (*Pyura stolonifera*)

due bacterial attack (Hanekom et al. 1999); and the impacts of coastal diamond mining (Parkins and Branch 1996a,b; Pulfrich et al. 2003a, b).

4. Respiratory adaptations and energy flow: 1977-1997:

Research was initiated on respiratory adaptations in conjunction with Prof RC Newell in 1977. This led us to develop the concept of "conservers" versus "exploiters", contrasting species which have low metabolic rates and thereby conserve energy with those that appear profligate in their metabolic rates. These extremes correlate with food availability (reviewed in Newell & Branch, 1980). Later expansion of the work confirmed these patterns, showed that these contrasts are tied in with growth rates and reproductive effort, and suggested that while "exploiters" are highly flexible and can cut down their metabolic rate if food is experimentally reduced, that "conservers" seem locked into a pattern of low metabolism, slow growth and low reproductive output (Branch et al., 1988). An inverse relationship between reproductive effort and longevity is clearly demonstrated by a comparison of *Patella* spp. (Branch, 1981). However, the commonly accepted trade-off between growth rate and reproductive effort is an illusion: both between and within limpet species the two are tightly correlated. Rather, it appears that some species are characterised by a high turnover (involving both reproduction and growth rate), while others are conservative and minimise both functions. This view, and other aspects of marine invertebrate reproductive patterns, are reviewed in Grahame & Branch (1985).

I have now ceased work on respiration, but remain interested in the allocation of energy to different components of the energy budget. Work on soft- and hard-corals shows that they devote different amounts of energy to combating the effects of sedimentation. This influences the types of habitat they can live in and, hence, the nature of coral-reef communities (Riegl & Branch, 1995). Current work deals with the energetic costs of molluscan shell erosion. Shell breakage elicits a short-term ecological cost in the form of energy diverted to repair. By contrast, limpets continually lay down shell to counter erosion, whether or not it takes place, so that erosion incurs a long-term evolutionary cost. The magnitude of this cost is linked to the type of shell microstructure, aragonitic shells being more expensive than calcitic shells (Day, Branch & Viljoen 2000). This research is the first (and so far, only) study to empirically measure the consequences of shell erosion.

5. Biology of exploited species. 1985-present.

I have become increasingly interested in using exploited species to explore ecological concepts. There are several advantages to this. First, there is an important niche to be filled that lies between the purely applied aspects of stock assessment and the more esoteric pure research that tends to attract academics. There are many aspects of the biology of these species which can best be tackled in an academic environment to complement the work done by government institutions. Second, exploited species tend to be abundant and often have dramatic ecological roles. Our first ventures in this direction were undertaken by Dr. A Barkai - then a PhD student of mine - who explored the role of rock lobsters as subtidal predators, and produced some of the most interesting research to flow from my laboratory. He demonstrated the dramatic effects lobsters have on community structure, and that they are generalised predators capable of surviving on even the most unexpected food, such as mysids and barnacle recruits. More significantly, this work yielded the first demonstration of a density-dependent reversal of a predator-prey relationship, and the first evidence of how alternative stable states can be maintained in natural ecosystems (Branch et al., 1987, Barkai & Branch, 1988a,b,c, Branch & Barkai, 1988).

This work is also of interest in terms of the currently slow growth rates being exhibited by lobsters (which profoundly reduce the sustainable yield). The usual explanation for the slow growth is that mussel recruitment has failed, depriving lobsters of their normal food. However, rock lobsters can survive and grow in localities where mussels are virtually absent (Barkai & Branch, 1988c), so this explanation is tenuous. Another of my students, S. Mayfield, is now focusing on a critical re-evaluation of rock-lobster diet, and his work also suggests that there is no correlation between food availability and growth rate.

A. Barkai (with M. Bergh) advocated radical departures from the conventional approach to managing rock-lobsters, namely a substantial reduction in minimum size, coupled with strict regulation of TAC, (thus spreading the fishing effort over a larger portion of the rock-lobster population, and reducing fishing mortality of previously undersized animals). Their proposals were largely implemented and were an important practical outcome of our group's research (see Castilla, Branch & Barkai, 1994 for a review).

The limpets *Patella argenvillei* and *P. granatina* are both targets for commercial exploitation, and we have developed a management procedure for harvesting, including controls on quotas and size limits. The work departs from conventional stock-management in two respects. First, we developed a metaphysiological stand-growth model to predict sustainable yields: the first application of this approach in the country (Bustamante, Getz & Branch, 1994). Second, we take into account the effects of harvesting at a community level rather than simply using a single-species approach (Eekhout, Raubenheimer, Branch, Bosman & Bergh, 1992). Harvests of one species, *P. argenvillei*, are bedevilled by the fact that it grows very slowly and is outcompeted by an alien mussel. Furthermore, most of its juveniles are found on shells of adults. None of these complications exists in the case of *P. granatina*, so that recommendations for its harvesting are much simpler.

I also lead a collaborative research programme concerned with the ecology of mussels (particularly their recruitment). This interfaces with a second programme (jointly lead by myself and J. Harris) that is developing co-management of mussel resources by local communities and the regional authority, Natal Parks Board. This work is current, but already it is clear that there are major geographic differences in the intensity of recruitment, and that adult mussel beds enhance recruitment. Both findings have important implications for management and for policies and regulations concerning mussel harvesting (Griffiths & Branch, 1997; Harris et al. 1998; Harris et al 2002).

An important group of studies deals with the ecology and management of rock lobsters and abalone. These began with experiments showing that urchins are vital for juvenile abalone (Day and Branch 2000 a,b, 2002a*). Laboratory studies demonstrated that juvenile abalone also obtain food from kelp trapped by urchins (Day and Branch 2002b,c). In parallel, research showed that rock lobsters locally increased in abundance and expanded their southern range, profoundly influencing benthic communities and abalone because as rock lobsters can locally extirpate urchins and thus decimate juvenile abalone (Mayfield, Branch and Cockcroft 1999, 2000, Mayfield and Branch 2000*, Mayfield, Lopata and Branch 2000, Mayfield et al 2000, 2002a,b,c, Lowenthal, Mayfield and Branch 2000, Griffiths, Mayfield and Branch 2000, Mayfield, de Beer and Branch 2001). Another paper that I rate highly is the first description of long-distance contranatal migration the deep-water lobster *Palinurus gilchristi* (Groeneveld and Branch 2002).

Research undertaken by my group thus mixes practical research with an underlying curiosity as to how ecological systems operate. This approach is summarised in an overview of the status, ecological consequences and practical management of the harvests invertebrate and seaweed stocks (Griffiths & Branch, 1997).

6. Fisheries policy, conservation, marine protected areas. 1994-present.

A recent departure for me has been my involvement in the development of new policies, particularly for fisheries management, conservation and marine protected areas. Our South African society is in a state of extraordinary change, and scientists have an unprecedented opportunity to influence political thinking and policies concerning environmental management. I am keenly aware that this is not the type of work that generates a high citation index, but I believe that in the long run it is immensely important for scientists to get involved and influence the future. Handled carefully, I also believe that there is no reason why good science should not be undertaken as part of this venture.

My own involvement began with an invitation from the Fisheries Policy Development Committee to chair a technical committee to advise on the difficult questions of how fisheries should be managed and how decisions should be taken about who gains access to the stocks. This yielded a substantial report (Branch et al., 1996), which powerfully influenced the final policy (see also van der Elst et al., 1997, in press).

My second venture was with a task team of the S. African Network for Coastal and Oceanographic Research (SANCOR), charged with reviewing marine protected areas (MPAs). This, too, resulted in a technical report (SANCOR, 1997), several of the chapters of which will be published in refereed journals. In particular I developed a methodology for objectively assessing potential and existing MPAs (Hockey & Branch, in press).

On the topic of selecting MPAs, the survey we conducted around the coast (1990-92) has allowed a re-evaluation of its biogeography. This revealed four distinct provinces, not three as previously described. In particular, there are two separate provinces on the west coast, with a cut-off at Lüderitz (Emanuel et al. 1992). Independent work on sandy-beach fauna and on phytoplankton corroborate this. The cut-off coincides with the most intense upwelling cell in southern Africa, which may act as a biogeographic barrier to dispersal.

This work has practical implications in terms of the design and siting of marine reserves. Firstly, the 'Namaqua Province' on the SW coast is the most poorly conserved province on the coast, and our work has contributed

towards the selection of a new National Park on this coast. Secondly, striking changes in community structure on rocky shores are correlated with wave action (Bustamante & Branch, 1996a,b) making it obvious that habitat heterogeneity is a vital issue when one is weighing up the conservation potential of different sections of coast. Species richness, often touted as an important measure of conservation potential is, in reality, a poor indicator because fails to reflect the diversity of community types that needs conservation (Emanuel et al., 1992; Hockey & Branch, 1994).

The years 1994-97 also saw the publication of several papers on the taxonomy and ecology of reef-building corals in South Africa, arising from a PhD thesis by B. Riegl. This work focused on Sodwana Bay, part of an MPA on the coast of KwaZulu-Natal. Riegl's thesis yielded 7 papers which provide the first reliable taxonomic review of South African corals, describes five new species, and analyses the impact of wave action and sedimentation on the reefs. It also documents the biotic structure of these reefs (Riegl, Schleyer, Cook & Branch, 1995), shows that sedimentation plays an important role in dictating community structure (Riegl & Branch, 1995; Riegl, Heine & Branch, 1997), assesses the extent to which recreational diving and boating are a threat, and makes practical recommendations for the management of this MPA.

7. The ecology of the intertidal and shallow subtidal zones of Sub-antarctic Marion

Island: 1980-present:

In 1980-1984 I co-supervised a national programme on the ecology of the intertidal zone of Marion Island, a project which yielded 12 papers and permitted quantification of energy-flow through the system. Two results arising are of particular interest. First, because the island is relatively small, extremely isolated and youthful, it provided an opportunity to test the prediction that the solitary endemic limpet there (*Nacella delesserti*) should have an unusually broad niche - which it does (Blankley & Branch, 1985). Secondly, *N. delesserti* achieves safety from the prevalent predatory starfish *Anasterias rupicola* when it exceeds a certain size. This is not unusual, but the observation that *A. rupicola* overcomes this limitation by feeding co-operatively in groups was the first demonstration of such a phenomenon in starfish (Blankley & Branch, 1984).

More recent work at the island concentrated on the biomass of the shallow subtidal zone, sampled by diving (Beckley & Branch, 1992), and on the offshore benthic fauna, which is being sampled by ship-based dredges. This research, led by my wife Margo Branch, has yielded descriptions of most of the invertebrate groups, including a series of keys for the identification of the benthic animals of Marion Island (three published, two in press, two in prep.), and a description of the distribution and trophic relations of the benthos (Branch, Attwood, Gianakouros & Branch, 1993). The publication of the remaining keys will mark the end of my involvement in this programme. In 2001, I was granted further funding to complete the work on the identification of benthic invertebrates, and my wife Margo Branch will be dealing with the taxonomy and biogeography of the Bryozoa to draw this to completion.

SELF-ASSESSMENT OF RESEARCH OVER THE PERIOD 1996-2002:

I believe I have contributed significantly to coastal research and management. There are several objective indicators of this. My productivity in the last 5 years has doubled: 44 papers or chapters (plus 11 in press), compared with 11, 18, 24, 24 & 28 in the five previous successive periods. In 1988, my productivity was the highest among South African marine scientists (McQuaid, C.D., 1989. S. Afr. J. Sci.) and I've gained steam since then. My latest 5-year output quadruples the national average of 9.1 for 'A-rated' scientists (FRD Programme Report Series no. 33, 1997). Many of my papers are co-authored, reflecting my belief in collaborative comparative work, and my policy that my students take first authorship. I only co-author papers if I make a significant input to the research, analysis and writing. I publish mostly in international journals but also support the South African Journal of Marine Science, which has an impact factor of 1.27, on a par with several top-class international marine journals.

My work is regularly quoted internationally and in textbooks. Over 1977-2002 I was cited 1503 times, in the same league as some of the great fisheries scientists such as R Hilborn, RA Myers, D Pauly, CJ Walters and JR Beddington (1110-2077 citations each). I am often invited to international conferences (see 6.8). In 2003, I was keynote or invited speaker at four international conferences, served on the Pew Fellowships Committee and by invitation contributed a chapter to a book and a review paper for the 300th volume of Journal of Experimental Marine Biology and Ecology. Over the last seven years I have run or participated in five international workshops and 11 conferences.

In total I have published 161 papers, chapters or books. Papers I rate highly are indicated below by * for the period 1996-2002, and by # for those prior that. These include reviews on metabolic patterns in marine invertebrates (Newell and Branch 1980#); competition in marine organisms Branch 1984#); and limpet biology (Branch 1981#; which remains my most cited paper and has the second-highest citation rate for a paper by any African marine scientist). I also rate highly a chapter reviewing rocky-shore community dynamics (Menge and Branch 2002*) and two books that have significantly contributed to education (Branch and Branch 1981#, Branch et al 1994#). Both received awards and one was a non-fiction best-seller and has been in print for 21 years.

My overall goal has been elucidating the dynamics of nearshore ecosystems and much of my research is relevant to management. It includes research on estuarine ecology and management (e.g. Branch et al 1885, Branch and Pringle 1987#, Wynberg and Branch 1997), but my main focus has been rocky shores. Important studies include the roles of productivity and subsidies (Bustamante et al 1995a#), the effect of gut surfactants on kelp polyphenol defenses (Tugwell and Branch 1992#), unique research on the significance of shell erosion (Day, Branch and Viljoen 2000*), the potential for limpet harvesting and its ecosystem consequences (Eekhout et al 1992, Bustamante et al 1994), processes permitting unusually high grazer biomass (Branch et al 1992, Bustamante et al 1995b#, Bustamante and Branch 1996b#, Plaganyi and Branch 2000*). Recent work on urchins, abalone and rock lobsters also ranks highly in my opinion (e.g. Mayfield and Branch 2000*, Day and Branch 2002a*, Groeneveld and Branch 2002), as does earlier work on alternative stable states induced by rock lobsters (e.g. Barkai and Branch 1988#).

In the field of policy development my aims are to contribute to national and international management (e.g. Pimm et al 2001*). Six chapters in "A Biodiversity Vision for the Galapagos" will help steer marine conservation there, and my development of a system for MPA evaluation already finds practical use in South Africa (Hockey and Branch 1997*) and has been adapted for world-wide application (Roberts et al in press a,b). My involvement with fisheries access rights and subsistence fisheries has helped direct policies (e.g. Branch et al 1996*, Branch et al 2002b*).

In sum, my contributions have been of two different kinds: one aimed at increasing scientific understanding of how nearshore and intertidal systems operate; and the other directed at development of policies that will improve management and conservation.

It is always tough to evaluate one's own output, but I believe I have made a significant contribution to coastal research and management in southern Africa. Certainly in the past 5 years I've enjoyed my science more than ever before, and hopefully that is not an entirely flippant measure of 'significance'! As a more defensible guide to my output, my successive production of papers over the last eight 5-year periods has been 2, 11, 18, 22, 20 & 29 and 33, with 32 papers and 14 in press for the last of these periods (1997-2001). Several of these papers are co-authored, and I can give the following indication of my contributions. I do not co-author papers with my students unless I make a significant input to at least three of the following five aspects of their work: conception, fund-raising, execution, analysis and writing. In most cases where a student is the senior author, I conceive the idea, lead the project, raise the funding and assist substantially with planning, discussion and write-up, but the student executes the bulk of the work. Papers written with colleagues as senior authors are usually based on an equal input by me. When I am senior author, I usually write the bulk of the paper.

A more independent and rigorous analysis of the field in which I work (McQuaid, C.D., 1989. A bibliography and analysis of trends in marine littoral research in South Africa, 1983-1988. *S. Afr. J. Sci.*) revealed that my productivity was then the highest in the country, and I don't think I've lost any steam since then. My work is regularly quoted internationally (see summary of citation rate under 2.1) and appears in several textbooks on animal ecology and marine biology. It is cited repeatedly in The Mollusca, a definitive series of volumes on the group. I am often invited to international conferences (see conference list under 2.5). In 1997 I was invited to run a week-long workshop on 'The ecology and management of coastal systems', at Leigh Marine Laboratory, New Zealand. I was the sole invitee from Africa to participate in the international series of workshops on Marine Protected Areas led by the National Centre for Ecological Synthesis, Santa Barbara, California, in 1999-2000, and in the Conservation International meeting in Mexico on 'Defying Ocean's End'. I also participated by invitation in the WWF workshops on Conservation of the Galapagos in 2000, and in the Pew Fellowships Meetings in 2001 and 2003.

Another way of comparing myself with my peers is to use the data in the 1997 FRD evaluation of their Core Programme (FRD Programme Report Series no 33). This notes that the mean number of scientific papers published by holders of 'A & B Grants' was 5.3 for the 5-year period 1990-1994, with a corresponding figure

of 9.1 for 'A' rated scientists. During this period, I published 17 papers, 1 book and 5 chapters in books. To update the output to 1997-2001: 32 papers or chapters in appeared, plus 14 in press.

My most significant early contributions are a series of papers on the ecology of limpets, particularly a review that summarises the literature and develops new concepts (Branch, 1981; still my most-cited paper with 201 citations). A review of competition in the sea (Branch, 1984a) and data on the specialisation of limpets (Branch, 1985a) include novel evidence of the role of competition. Together with R. Newell I developed a new concept relating to the metabolic rates of intertidal organisms (reviewed in Branch et al., 1988). Other products I consider significant are the books *Living Shores of Southern Africa*, (Branch & Branch, 1981) and *Two Oceans - a guide to the marine life of southern Africa* (Branch, Griffiths, Branch & Beckley, 1994). Although popular rather than scientific, there is no doubt that they has contributed substantially to public awareness and education.

2.3. SUPERVISION OF POSTGRADUATES:

I currently supervise 7 M.Sc. and 8 Ph.D. students; 30 M.Sc. and 29 Ph.D. students of mine have already graduated. A quantitative comparison of my output of postgraduate students can be obtained from data in the FRD's evaluation of its core programme (FRD Programme Report Series no. 33). On average, 'A' rated scientists produced 7.9 MSc and PhD students for the 5-year period 1990-1994, and 'A' & 'B' grant-holders 4.0. These figures provide an objective comparison with my own output of 11 students over this period, and 15 students for the period 1996-2002.

Past students:

a) Master of Science

- B. Brunhuber, 1968. Reproductive behaviour and morphology of the Cape centipede *Cormocephalus*.
- C. Gaigher, 1979. Ecology of the bloodworm *Arenicola loveni*.
- G. Cliff, 1979. (With distinction). Availability of detritus, bacteria and phytoplankton to an intertidal rocky reef in False Bay. (2 papers published from thesis; 15 other papers)
- P.A. Shelton, 1979. Distribution and migration of larval stages of commercially important pelagic fish on the western Cape coast.
- T. de Chalais, 1980. (With distinction). Settlement and succession on artificial plates. (2 papers published from thesis)
- J. Henschel, 1980. (With distinction). A comparison of marine fouling on different types of substrata. (3 papers published from thesis; 15 other papers.)
- S. Pillar, 1982. An analysis and comparison of sampling techniques for zooplankton.
- W.O. Blankley, 1982. (With distinction). The intertidal and shallow subtidal foodweb of sub-Antarctic Marion Island. (4 papers published from thesis; 12 other papers)
- C. Roberts, 1984. The ecological role of bacteria in the Bot River Estuary. (2 papers published from thesis.)
- H.P. de Decker, 1986 (With distinction). Benthic macrofauna of the Bot River Estuary. (3 papers published from thesis.)
- R. Cruikshank, 1988. Ecology of the migration and distribution of the anchovy *Engraulis capensis* off Namibia.
- R. Wynberg, 1991. Ecological effects of collecting *Callinassa kraussi* Stebbing and *Upogebia africana* Ortman for bait: impacts on the biota of an intertidal sandflat.

- (Registered 1988, full-time, degree awarded with distinction.)(4 papers published from thesis; 12 other papers)
- P. le Roux, 1991. The population and feeding biology of rock crabs on the Cape Peninsula. (Registered 1989, full-time, co-supervised with Prof. CL Griffiths.)(3 papers published from thesis)
- C.G. Attwood, 1991. Ecological processes in the Prince Edward Island Seas. (Registered 1990, full-time, co-supervised with ML Lucas as senior supervisor. Degree with distinction)(3 papers published from thesis; 15 other papers)
- D. Glassom, 1992. Predation/disturbance effects of greater flamingos (*Phoenicopterus ruber*) on the benthic communities of two southern African lagoons. (Registered 1990, full time.)(2 papers published from thesis, plus 6 other papers)
- B. Tomalin, 1993. Migrations of spiny rock lobsters *Jasus lalandii* at Luderitz: environmental cause, and effects on the fishery and benthic ecology. (Registered 1988, part-time.)
- M.L. Branch. 1994. Benthic invertebrate fauna of Marion Island. (Registered 1993, senior supervisor CL Griffiths. Degree awarded with distinction). (6 papers published from thesis, 1 in press; 8 other papers and 4 books)
- A. Leeb. 1995. Impact of wave action on mussel recruitment and population dynamics. (Registered 1992, full-time.)
- N.R. Henry, 1996. Aspects of the cultivation of abalone, *Haliotis midae*. (Registered 1992, part-time. Jointly supervised with A.C. Brown.). Papers arising from thesis: 1; other papers:2)
- T. Ridgway. 1998. A genetic and morphological analysis of species complexes within the genus *Patella*. (Registered 1997, full-time.) Degree awarded with distinction. Papers arising from thesis: 4. Symposium presentations: 5, including 2 international; 7 other papers.
- M. Gagliani. 1999. A study of the South African abalone *Haliotis midae* at Betty's Bay Sanctuary, with particular reference to reproductive biology. University of Aberdeen. (Registered 1998, graduated 1999)
- Craig Smith. 1999. Aspects of the biology and management of Octopus species. (Registered 1997, fulltime.) Papers from thesis: 2 published, 1 submitted (co-supervisor CL Griffiths, additional co-supervisor M. Smale.)
- Cameron Smith. 1999. A comparison between macrofaunal communities on mixed shores and rocky and sandy shores in False Bay. The ecology of shores of mixed sand and rock. (Registered 1996, part-time; co-supervisor AC Brown.)
- L. Atkinson. 2001. Large and small-scale movement patterns of the west coast rock lobster *Jasus lalandii*. (Registered 1999, fulltime; Co-supervisor S Mayfield).
- A. Angel. 2002. Cause of rarity of an endemic limpet, *Siphonaria compressa*. MSc in Conservation Biology. Papers from thesis: 2 in prep.; conferences: 4. (Registered 2001, full-time).
- C. Stobie. 2002. Trophic interaction within South African Intertidal Mussel Beds. Papers from thesis: 2 in prep; conferences: 2. (Registered 1999, full-time; co-supervisor JG Field).
- T. Siebert. 2003 (with distinction). The ecological effects of bioturbation on the eelgrass *Zostera capensis*: community interactions and the impacts on the biota of an intertidal sandflat. Papers from thesis: 4 in prep. Conferences: 2. (Registered 1999, fulltime; degree with distinction)

- N. Kruger. 2003. Long-term changes in the benthic macrofauna of Saldanha Bay. Papers from thesis: 2 in prep. Conferences: 2. (Registered 2000, fulltime; co-supervisors CL Griffiths and JG Field)
- R Wright. 2005. Population dynamics of turtles. 2 papers I prep; conferences: 3 (Registered 2003, co-supervised by A. Govender; degree with distinction)
- M. Pfaff. 2005. Disturbance and productivity as factors influencing rocky shores (Registered 2004; degree with distinction)
- H. Bloomfield 2005. Population dynamics, habitat selectivity and movement of *Haliotis spadicea* (Donovan 1808): effects and implications for marine protected areas in South Africa. Registered 2004, University of Wales, Bangor.
- C. Lawrence. 2005 Biodiversity survey towards conservation of subtidal reef habitats in KwaZulu-Natal. (Registered 2003, co-supervised by J.M. Harris)
- P. Nel. 2006. Exploitation of the bait organism *Callinassa kraussi* Stebbing (Crustacea: Decapoda: Thalassinidea) in Langebaan Lagoon. (Registered 1999, part-time.)
- L. Kemp. 2006 Ancient stonewall fish traps on the south coast of South Africa: documentation, current use, ecological effects and management implications. (Registered 2004; leave of absence in 2005. Degree with distinction; Thesis awarded S₂A₃ Bronze Medal for best MSc in South Africa.)

b) Master of Business Administration

- W.O. Blankley, 1989. Commercial potential and appropriate management strategies for limpets on the coast of Namaqualand, South Africa.

c) Ph.D.

- M.J. O'Toole, 1975. Investigations into some important fish larvae in the south-east Atlantic in relation to the hydrographic environment. 4 papers from thesis; 47 other papers published
- D.L. Cram, 1977. On the calculation of pelagic fish shoal tonnage by aerial night-time observation. 5 papers from thesis; 27 other papers.
- J.A. Day, 1978. Southern African Cumacea. 5 papers from thesis; 35 other papers, 1 book.
- G.M. Puttick, 1979. The feeding ecology of the Curlew Sandpiper *Calidrus ferruginea* in the south-western Cape, South Africa. 3 papers from thesis.
- C.D. McQuaid, 1982. Spatial and temporal variations in rocky intertidal communities. 5 papers from thesis; 97 other papers
- R.J. Griffiths. 1982. Ecophysiology of the black mussel *Choromytilus meridionalis* (Krauss). 5 papers from thesis; 16 other papers.
- J.M. King, 1983. An ecological study of the macro-invertebrate fauna of the Eeste River, Western Cape Province, South Africa. 4 papers from thesis; 27 other papers.
- P.A.R. Hockey, 1983. The ecology of the African Black Oystercatcher, *Haematopus moquini*. (Partial supervision only). 6 papers from thesis; 87 other papers.
- H.F.-K.O. Hennig, 1985. Metal-binding proteins as a pollution indicator.
- L. Beckley, 1985. Coastal zone utilisation by juvenile fish in the eastern Cape, South Africa. 4 papers from thesis; 57 other papers.

- G. Williams, 1987. Systematics and zoogeography of southern African octocoral cnidarians. 6 papers from thesis; 62 other papers.
- R. Melville-Smith, 1987. Aspects of the biology and population dynamics of the deep-water commercially exploited crabs of SWA/Namibia. (Junior supervisor with CL Griffiths). 3 papers from thesis; 54 other papers.
- A. Barkai, 1987. Biologically induced alternative states in two rocky subtidal benthic communities. 6 papers from thesis; 12 other papers.
- P. Zoutendyk, 1987. Carbon and nitrogen flux through the Cape rock lobster *Jasus lalandii* (H. Milne Edwards), with particular reference to the nearshore Benguela system. (Joint supervision with J.G. Field). 4 papers from thesis; 15 other papers.
- M. Delafontaine, 1987. Aspects of the biology of the intertidal barnacle *Tetraclita serrata* Darwin in southern Africa. 2 papers from thesis; 12 other papers.
- B.A. Bennett, 1989 The utilisation of littoral and estuarine habitats by fish in the south-western Cape. (Registered 1980, part-time). 5 papers from thesis; 12 other papers.
- J.M. Harris, 1992. Relationships between invertebrate detritivores and gut bacteria in marine systems. (Registered 1989. Full-time. Jointly supervised with ML Lucas. Thesis papers: 6 published, 1 submitted; other papers: 27; symposium presentations: 22, including 3 invited papers at international conferences)
- A.L. Cohen, 1993: A Holocene sea surface temperature record in mollusc shells from the South Africa coast. (Jointly supervised with N van der Merwe. Thesis papers: 5 published; other papers: 3; symposium presentations: 6; other papers 15)
- B.M. Riegl, 1993: The taxonomy and ecology of South African reef corals. (Registered 1991, full-time. Co-supervised with PA Cook and M Schleyer. Thesis papers 7 published; other papers: 37; symposium presentations: 27)
- R. Bustamante, 1994: The impact of offshore kelp production on the ecology of intertidal rocky shores. (Registered 1989, full-time. Thesis papers: 6 published; other papers: 27; symposium presentations: 22)
- B.J. Tibbles, 1994: Ecology and physiology of bacterial activity in a temperate saltmarsh lagoon, with an emphasis on nitrogen fixation. (Registered 1990, M.L. Lucas senior co-supervisor. Thesis papers published: 3; other papers: 3; symposium presentations: 8, including 1 invited paper for international conference.)
- Y. Dempster, 1996: Biochemical and morphological systematics of the Southern African genera *Burnupena* (Buccinidae) and *Oxysteles* (Trochidae). (Registered 1987, part-time. Thesis papers published: 2; papers in prep: 4; symposium presentations: 3)
- E. Day (nee Reynolds). 1998. Ecological interactions between abalone (*Haliotis midae*) juveniles and sea urchins (*Parechinus angulosus*) off the South-West coast of South Africa. (Registered 1995, Part-time.). Thesis papers published: 5. Conferences: 4 papers.
- S. Mayfield. 1998. Assessment of the diet of the Cape rock lobster (*Jasus lalandii*) by visual and non-visual methods. (Registered 1994, full-time.) Papers published from thesis: 5 plus 1 in press. Conferences: 8, including 1 international.
- J. Groenewald. 2001. Biology and Ecology of the deep-water rock lobsters *Palinurus gilchristi* and *Palinurus delagoae* in relation to their fisheries. (Registered 1999, part-time. Papers published from thesis: 8, plus 1 in press; 16 other papers; 12 conference presentations)

- N. Steffani. 2001. Interactions between an indigenous limpet, *Scutellastra argenvillei*, and an alien invasive mussel, *Mytilus galloprovincialis*: moderation by wave action. (Registered 1997, full-time. Conferences papers: 4)
- K. Sink. 2001. A hierarchical analysis of abiotic determinants and harvesting impacts in the rocky intertidal communities of KwaZulu-Natal. (Registered 1996, full-time. Conference papers 2)
- C. Attwood. 2002. Spatial and temporal dynamics of an exploited reef-fish population. (Registered 1999, part-time; Thesis papers 1; 22 other papers; 12 conference presentations).
- S. W. P. de Waal. 2002. Factors influencing the ranching of the abalone species *Haliotis midae* along the Namaqualand coast of South Africa. (Registered 2000, fulltime; co-supervised by Prof PA Cook; thesis papers 2; 6 other papers)
- T. Robinson: 2005. Alien marine species in South Africa: Threats and opportunities. (Registered 2002. Thesis papers: 6, conference proceedings: 6; co-supervisors CL Griffiths and A Govender)
- E. Wieters. 2006. Benthic-pelagic coupling: rocky intertidal communities and nearshore oceanographic conditions across multiple scales. (Registered 2002; Thesis awarded inaugural prize for best PhD in Science Faculty)
- D. Pillay. 2006. The influence of bioturbation by the sandprawn *Callianassa kraussi* Stebbing on macrobenthic assemblages on the Little Lagoon, Durban Bay. (Registered 2003 at University of Natal, Durban; senior supervisor T. Forbes; thesis papers: 5)
- K. Reaugh. 2006. Connectivity of rocky shore species: an integrated study of coastal oceanography, larval supply and recruitment (Registered 2002 Thesis papers: 6).

Current graduate students:

a). Master of Science

- Erich Maletzky. Effects of oxygen, temperature, sedimentation and hydrogen sulphide on rock lobsters. (Registering 2005; co-supervision Steve Brouwer.)
- Catherine Greengrass. Pueruli of rock lobsters: distribution and abundance. Registering 2005. (Co-supervision by Johan Groeneveld).
- Monique Bouchers. Assessment of trap-fishing for the deep-sea lobster *Panulirus delagoae*. (Registered Feb. 2006; Co-supervisors Steve Kirkman and Johan Groeneveld)
- Sandile Sibiyi: Measuring success of co-management of natural resources used by rural subsistence resource users (Registered 2006, part-time; co-supervisor JM Harris)

b) Ph.D.

- L. Blamey. Changes in benthic community composition related to rock lobster abundance (Registering 2005).
- P. de Coito. Genetics of a rare and endangered limpet, *Siphonaria compressa* (Registering 2005).

- S. Lamberth. Management of linefish resources. (Registered 1999, part-time.)
- T. Peschak. Interactions between abalone, corallines and kelp. (Registered 1999, full-time).
- J. Mwacigi. Relationships between squid and epinephaloid layers. (Registering 2003; co-supervised M. Roberts).
- M. Pfaff. Larval abundance and settling in relation to upwelling and wave action. (Registering 2005).
- S. Porter. Community structure on shallow reefs in KwaZulu-Natal (Registered 2004).

Achievements of students:

Thirteen of my 33 M.Sc. students (37%) obtained distinctions for their degrees (distinctions normally being granted to the top ca. 10-15% of M.Sc. graduands). Four of my PhD students now occupy senior positions in academic departments, two (JA Day and CD McQuaid), having risen to Professorial status and headship at UCT and Rhodes University. Three others are members of the SANCOR Executive Committee, appointed by NRF and DEA to steer their joint venture programmes and to give advice on the course of marine science in South Africa. On seven occasions, my students have won the award for best student paper or best student poster at our national marine and zoological symposia. Bustamante and Siebert were awarded the Purcell Prize for the best zoological thesis in 1995, and Barkai the I&J prize for the best thesis on a marine topic in 1988. Eleven students received invitations to international symposia even before they graduated. Wieters won the inaugural award of “Best PhD” in the Science Faculty in 2007. Wynberg represented South Africa at the Rio conference and was subsequently charged with the enormous responsibility of drawing up the white and green papers for *Conservation and Sustainable Use of South Africa’s Biodiversity*. Bustamante has risen to being Director of Marine research at the Charles Darwin Research Station, Galapagos. In 2000, both Jean Harris and Rodrigo Bustamante were awarded prestigious Pew awards for marine conservation. In 2006, One of my MSc students, Lucy Kemp, was awarded the South African Association for the Advancement of Science Bronze Medal for the best MSc in the country, and a PhD student, Evie Wieters, won the Purcell Award for the best PhD on a zoological topic. These are all indicators of the quality of students with whom I am privileged to work.

2.4 CONTRIBUTIONS TO CORRECTIVE ACTION

Of my past post-graduate students, 35% have been female. Of the current crop of 11 students, five are female, three are black, and I have promoted the research of three additional black honours students. Of the five staff employed by my research programmes, one is male and four are female. I have lead two research projects (one current) involving collaborative programmes with Historically Black Universities (University of Transkei and University of the Western Cape). In my capacity as Chair of the Access Rights Technical Committee I had the privilege of collaborating with two distinguished black academics, Dr Zunaid Moola (CPA) and Prof Paulus Zulu (University of Natal). In terms of staff development, as head of the department of zoology, University of Cape Town, I was responsible for the appointment of the department’s first black academic, and I have always adopted a policy of equal opportunity for the sexes, so that six of our staff of 14 academics are female. One of my research programmes (a WWF-funded programme on mussel utilisation, jointly lead with Jean Harris) has a strong element of human empowerment, actively involving local communities of previously disadvantaged people in both research and co-management of resources. This has resulted in the training of 9 black people, most of them female, in committee procedures and a further 12 as researchers and monitors. Although none of these people acquire formal certification for this training, the fact that several have been snapped up by authorities concerned with marine management indicates that the training is effective. My participation as vice chair of the Subsistence Fisheries Task Group involved collaboration with people of all races and of both sexes, and led to my co-authoring five papers with members of three historically disadvantaged universities and technical colleges.

2.5 OTHER RESEARCH-BASED SCHOLASTIC CONTRIBUTIONS:

A. CONFERENCE PROCEEDINGS

*=Invited contribution or keynote paper at international meeting.

- BRANCH, G.M. 1973. The ecology of Patella cochlear with reference to oil pollution. 2nd S. Afr. Nat. Oceanogr. Symp.
- BRANCH, G.M. 1975. The ecology of rocky shores. Invited paper. Habitat.
- BRANCH, G.M. 1977. The ecology of Umngazana estuary. Transkei and Ciskei Research Society.
- BRANCH, G.M., CHRISTIE, N., MOLDAN, A. & PUTTICK, G. 1977. The ecology of intertidal and subtidal benthic fauna of Saldanha and Langebaan. Symposium of the Roy. Soc. S. Afr., Saldanha.
- BRANCH, G.M. 1976. Ecological implications of competition in limpets. S. Afr. Nat. oceanogr. and Freshwater symposium.
- BRANCH, G.M. Productivity of estuaries, 3rd S. Afr. Nat. Oceanogr. Symp. (invited contribution to workshop).
- BRANCH, G.M. 1979. Territoriality in limpets: manipulative experiments and energy budgets. Invited paper at International Mollusc Symposium, Sydney.
- BRANCH, G.M. 1979. Food as a limiting resource for intertidal herbivores. 4th S. Afr. Nat. oceanogr. Symp.
- BRANCH, G.M. & NEWELL, R.C. & BROWN, A.C. 1979. Respiratory adaptations in intertidal organisms. 4th S. Afr. Oceanogr. Symp.
- *BRANCH, G.M. 1982. Competition as a selective agent: some examples from rocky shores. Invited speaker: International Symposium on Species and Speciation, Pretoria Museum, Pretoria.
- BRANCH, G.M. et al. 1984. Management of the Bot River Estuary. Joint organiser and chairman of Royal Society Symposium.
- BRANCH, G.M. 1984. Intertidal and subtidal research in the Benguela System. 5th S. Afr. Nat. Oceanogr. Symp. (guest paper).
- BENNETT, B.A. & BRANCH, G.M. Feeding periods of fishes inhabiting marginal areas of the Botrivierlei. 5th S. Afr. nat. oceanogr. Symp. (Poster).
- ROBERTS, C., ROBB, F. & BRANCH, G.M. 1984. Microbial ecology of the Bot River Estuary. 5th S. Afr. nat. oceanogr. Symp. (Poster).
- BRANCH, G.M. & CHERRY, M.I. 1984. Activity rhythms in the pulmonate limpet Siphonaria capensis. 5th S. Afr. nat. oceanogr. Symp. (Poster).
- HOCKEY, P.A.R. & BRANCH, G.M. 1984. Feeding of birds on rocky shores: competition or facilitation? 5th S. Afr. nat. oceanogr. Symp. (Poster).
- HOCKEY, P.A.R. & BRANCH, G.M. 1984. Dynamics of island limpet populations: the importance of being big. 5th S. Afr. nat. oceanogr. Symp. (Poster).
- *BRANCH, G.M. 1985. Metabolic adaptations in intertidal invertebrates, particularly limpets. Invited keynote paper at American Society of Zoologists Annual Conference, Baltimore.
- *BRANCH, G.M., BARKAI, A., HOCKEY, P.A.R. & HUTCHINGS, L. 1986. Biological interactions : causes or effects of variability in the Benguela Ecosystem? Invited paper, International conference on The Benguela and Comparable Ecosystems, Cape Town.
- BARKAI, A. & BRANCH, G.M. 1986. Biologically induced alternative stable states. International conference on The Benguela and Comparable Ecosystems, Cape Town. (Poster).
- PRINGLE, A. & BRANCH, G.M. 1986. Biological effects of bioturbation by sand prawns. International conference on The Benguela and Comparable Ecosystems, Cape Town. (Poster).
- BRANCH, G.M. 1987. Do oystercatchers feed optimally? 6th S.A. Nat. oceanogr. Symp., Stellenbosch. (Poster).
- BRANCH, G.M. & PRINGLE, A. 1987. Production of benthic microalgae. 6th Nat. oceanogr. Symposium. (Poster).
- TUGWELL, G.M. & BRANCH, G.M. 1987. Kelp defence mechanisms. 6th Nat. Oceanogr. Symposium. (Poster).
- HARRIS, J. & BRANCH, G.M. 1987. Coevolution in question. 6th Nat. Oceanogr. Symposium. Invited paper.
- *BRANCH, G.M. & BARKAI, A. 1987. Interspecific behaviour: implications for evolution population dynamics & community structure. Invited keynote paper, International NATO Congress on : Behavioural Adaptations to Intertidal Life. Castiglione, Italy.

- *BRANCH, G.M. 1987. Activity rhythms of *Siphonaria thersites*. International NATO Congress on : Behavioural Adaptations to Intertidal Life. Castiglioncello, Italy.
- BRANCH, G.M. 1988. Recent needs for coastal zone management in the Ciskei and Transkei. Empakweni, Ciskei, March 1988. Organiser and Chairman of meeting.
- BUSTAMANTE, R., EEKHOUT, S. & BRANCH, G.M. 1990. Influence of physical factors on the biotic communities of rocky intertidal shores. Symposium of the Zoological Society of Southern Africa, Port Elizabeth.
- *BRANCH, G.M., HARRIS, J.M., PARKINS, C., BUSTAMANTE, R. & EEKHOUT, S. 1990. Algal "gardening" by grazers: a comparison of the ecological effects of territorial fish and limpets. Invited keynote paper for International Symposium on Animal-plant interactions in the Marine Benthos, Liverpool, Sept. 1990.
- TUGWELL, S & BRANCH, G.M. 1990. The influence of gut surfactants on polyphenols as digestibility-reducing compounds. Paper for International Symposium on Animal-plant Interactions in the Marine Benthos, Liverpool, Sept. 1990.
- EEKHOUT, S & BRANCH, G.M. 1990. Ecological consequences of commercial exploitation of *Patella argenvillei*. Poster presented at 7th National Oceanographic Symposium, San Lameer.
- BUSTAMANTE, R., & BRANCH, G.M. 1990. Limpets as a link between intertidal and subtidal communities on the west coast of South Africa. Paper for International Symposium on Animal-plant Interactions in the Marine Benthos, Liverpool, Sept. 1990.
- BRANCH, G.M., EEKHOUT, S. & BUSTAMANTE, R. 1990. Southern African rocky-shore communities: hypotheses and coastal patterns. Invited review paper, 7th National Oceanographic Symposium, San Lameer.
- TUGWELL, S. & BRANCH, G.M. 1990. The effects of herbivore gut surfactants on kelp polyphenol defences. Paper presented at 7th National Oceanographic Symposium, San Lameer.
- BUSTAMANTE, R., EEKHOUT, S., BRANCH, G.M., ODENDAAL F., BOSMAN, A., BERGH, M.O. & RAUBENHEIMER, C. 1991. A holistic approach to the exploitation of virgin intertidal stocks: limpets as a case history. Paper presented at International Symposium Benguela Trophic Functioning. Cape Town, September 1991.
- BRANCH, G.M., BUSTAMANTE, R., EEKHOUT, S., EMANUEL, B. & ODENDAAL, F. 1991. A zoogeographic and functional approach to the selection of reserves on the west coast of South Africa. Paper presented at International Symposium Benguela Trophic Functioning. Cape Town, September 1991.
- EEKHOUT, S., BRANCH, G.M. & ODENDAAL, F., 1991. Wave action as a force structuring mussel-limpet communities: what happens today needn't happen tomorrow. Poster for International Symposium Benguela Trophic Functioning. Cape Town, September 1991.
- *BRANCH, G.M. 1991. A review of the Benguela Ecology Programme. Invited keynote review for International Symposium Benguela Trophic Functioning. Cape Town, September 1991.
- GLASSOM, D., & BRANCH, G.M. 1991. Flamingos: disturbance effects on benthic estuarine fauna. Poster for International Symposium Benguela Trophic Functioning. Cape Town, September 1991.
- BRANCH, G.M., BUSTAMANTE, R., EEKHOUT, S. & EMANUEL, B. 1991. Selection of coastal reserves. Paper presented at Marine, Estuarine and Freshwater Ecosystems Conference, Grahamstown, July 1991.
- *BRANCH, G.M., BUSTAMANTE, R., EEKHOUT, S. & EMANUEL, B. 1992. A zoogeographic and functional approach to the selection of marine reserves. Second International Temperate Reef Symposium, Auckland, January 1992. Invited paper.
- EEKHOUT, S., BRANCH, G.M. & ODENDAAL, F.J., 1992. Wave action as a force structuring mussel-limpet communities: what happens today needn't happen tomorrow. Second International Temperate Reef Symposium, Auckland, January 1992.
- *BRANCH, G.M., BUSTAMANTE, R., & EEKHOUT, S. 1992. Patterns of biomass and diversity along a productivity gradient around the coast of southern Africa. International SCOPE meeting, Vancouver Island, September 1992. Invited paper.

- *BUSTAMANTE, R, BRANCH, G.M., EMANUEL. B. 1992. Biogeographic patterns in relation to productivity. International SCOPE meeting, Vancouver Island, September 1992. Invited paper.
- BRANCH, G.M., BUSTAMANTE, R., EEKHOUT. S., ROBERTSON, B., SCHLEYER, M., ZOUTENDYK, P., DYE, A., MCQUAID, C.D., HANEKOM, N., KEATS, D., JURD, M. & MALLOY, F. 1993. Intertidal microalgal productivity around the South African coast: synthesis of a multi-author research project. 8th S. African Marine Science Symposium, Mykonos, October 1993.
- BUSTAMANTE, R, GETZ, W & BRANCH, G.M. 1993. Can ecological theory complement resource management? An analysis of a potential limpet fishery using a metaphysiological stand-growth model. 8th S. African Marine Science Symposium, Mykonos, October 1993.
- WYNBERG, R. & BRANCH, G.M. 1993. Disturbance associated with bait collection for sand prawns (*Callinassa kraussi*) and mudprawns (*Upogebia africana*): effects on the biota of intertidal sandflats. 8th S. African Marine Science Symposium, Mykonos, October 1993.
- BRANCH, G.M. & LINDBERG, D. 1993. Application of shell microstructure to limpet phylogeny. Workshop on limpet phylogeny, associated with the 100th Anniversary Symposium of the Malacological Society. London, Sept. 1993. (Co-organiser of workshop with A. Hodgson.)
- *BRANCH, G.M. 1995. Species redundancy: a rocky-shore perspective and a comparison with soft-sediment lagoons. Invited paper: Third International Temperate Reef Symposium, Sydney, February 1995. Invited speaker.
- *BRANCH, G.M. 1995. The theory of evolution: facts, fads and fancies. Invited paper: South African Science and Religion Forum, 1995 conference, Pretoria.
- HANEKOM, N., HARRIS, J.M., AND BRANCH, G.M. 1995. Microbial infection and mass mortality of redbait *Pyura stolonifera* along the South coast of southern Africa. Zoological Society of Southern Africa Symposium, Grahamstown. Poster.
- BRANCH, G.M. 1995. Conservation of southern Africa's wild living resources: exploitation, sustainability and ethics. Cape Town 5 May, 1995. Session Chairman.
- ATTWOOD, C. & MARINE RESERVES TASK GROUP 1996. Drafting a policy for the use of marine protected areas in South Africa. Paper: 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- DAY, E & BRANCH G.M. 1996. Interactions between sea urchins and juvenile abalone. Plenary paper: 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- HARRIS, J., WILSON A.J. & BRANCH G.M. 1996. Towards sustainable subsistence utilisation of mussels in KwaZulu-Natal through participatory experimental harvesting and co-management. Plenary paper: 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- MAYFIELD, S., BRANCH G.M., LOPATA, A. & COCKCROFT, A. 1996. New developments in the study of the diet of West Coast rock lobsters (*Jasus lalandii*). Paper: 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- *BRANCH, G.M. & GRIFFITHS, C.L 1996. The exploitation of coastal marine resources in South Africa: historical trends, ecological impacts and implications for management. Invited paper, Gilchrist memorial plenary, 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- GRIFFITHS, M., MAYFIELD, S. & BRANCH, G.M. 1996. Rock lobster diet: differences between trap and dive-caught *Jasus lalandii*. Poster: 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- LOWENTHAL, D., MAYFIELD, S., & BRANCH G.M. 1996. Trap efficiency for the west coast rock lobster, *Jasus lalandii*. Poster: 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- WILSON. A.J., HARRIS, J.M. & BRANCH, G.M. 1996. Participation of a local community in the assessment of implements for the subsistence harvesting of mussels in KwaZulu-Natal. Poster: 9th Sn African Marine Science Symposium, Cape Town. November 1996.
- PARKINS, C. & BRANCH, G.M. 1996. Monitoring the effects of diamond mining and shore-based diamond diving on the intertidal rocky shores of the Sperrgebiet coast. Poster: 9th Sn African Marine Science Symposium, Cape Town. November 1996.

- MAYFIELD, S., DAY, E. & BRANCH, G.M. 1997. Lobsters, urchins and abalone: a prickly problem. Paper: Zoological Society of Southern Africa, Cape Town, July 1997.
- *BRANCH, G.M. 1997. Can we improve predictions from ecological; studies in the face of temporal and spatial variability? New Zealand/Australia Marine Science Conference. Auckland, New Zealand, July 1997. (Invited paper and Chair of 2 sessions.)
- MAYFIELD, S., BRANCH, G.M. & DAY, E. 1997. The vital role of urchins and influence of rock lobsters on juvenile abalone, *Haliotis midae*. Paper: 3rd International Abalone Symposium, Monterey, California. October 1997.
- *BRANCH, G.M., MAYFIELD, S., & DAY, E. 1997. Sea urchins and lobsters: vital impacts on juvenile abalone. Invited paper: 4th International Temperate reef Symposium. Santiago, Chile, July 1997.
- *BRANCH, G.M. 1997. Criteria for evaluating marine reserves. Invited paper: 4th International Temperate reef Symposium. Santiago, Chile, July 1997.
- *BRANCH, G.M. 1998. How to improve ecological research in marine systems. Australian and New Zealand Marine Science symposium. Auckland.
- BRANCH, G.M. 1998. Managing marine resources. Fishers Forum, Galapagos Marine Management Programme.
- BRANCH, G. M. 1999. International MPA meetings, National Centre for Ecological Analysis and Synthesis, Santa Barbara, 1998-2000. Invited contributor.
- HARRIS, J.M., TOMALIN, B. & BRANCH G.M. 2000. Sustainable subsistence intertidal harvesting: a participatory experimental approach. South African Marine Science Symposium. Wilderness.
- HARRIS, J.M., BRANCH, G.M., ELLIOTT, B., CURRIE, B., DYE, A., MCQUAID, C. & TOMALIN, B. 2000. Recruitment of intertidal mussels around the coast of southern Africa – how variable is it? South African Marine Science Symposium. Wilderness.
- MAYFIELD, S., ATKINSON, L. & BRANCH, G.M. 2000. Reserves for rock lobsters: are they a bureaucratic blunder? South African Marine Science Symposium. Wilderness.
- *BRANCH, G.M. 2000. Criteria for selecting marine reserves. WWF International Meeting on a Biodiversity Vision for the Galapagos Islands. Santa Cruz, Galapagos. Invited keynote speaker and facilitator.
- ATKINSON, L., MAYFIELD, S., BRANCH, G.M. & A.C. COCKCROFT. 2000. Mesocosm experiments monitoring movements of the West Coast rock lobster (*Jasus lalandii*). 5th International Temperate Reef Symposium, Cape Town.
- BRANCH, G.M. & F. ODENDAAL. The influence of Marine Protected Areas and wave action on the populations of a protandric South African limpet, *Cymbula oculus*. 5th International Temperate Reef Symposium, Cape Town.
- HARRIS, J.M., ELLIOTT, B., BRANCH, G.M., DYE, A., TOMALIN, B MCQUAID, C. & CURRIE, B. 2000. Recruitment of intertidal mussels around the coast of southern Africa. Plenary paper, 5th International Temperate Reef Symposium, Cape Town.
- SINK, K. & BRANCH, G.M. 2000. The rocky intertidal habitats of KwaZulu-Natal: linking biological communities with environmental factors in the interests of conservation of biodiversity and resources. 5th International Temperate Reef Symposium, Cape Town.
- STEFFANI, N. & BRANCH, G.M. 2000. Moderation of competition between the limpet *Patella argenvillei* and the alien mussel *Mytilus galloprovincialis* – the effects of wave action. 5th International Temperate Reef Symposium, Cape Town.
- STOBIE, C., GRIFFIN, G.M. & BRANCH G.M. 2000. Effects of wave action on feeding rates of the predatory whelk *Nucella cingulata* in the rocky intertidal zone. 5th International Temperate Reef Symposium, Cape Town.
- RUIZ SEBASTIAN, C., STEFFANI, N & BRANCH G.M. 2000. Homing and movement patterns of the limpet *Patella argenvillei* in a population encroached by the Mediterranean black mussel (*Mytilus galloprovincialis*) on the South African west coast. 5th International Temperate Reef Symposium, Cape Town.
- PESCHAK, T AND BRANCH G.M. 2000. The role of the South African abalone, *Haliotis midae*, in the reproductive ecology of the bamboo kelp, *Ecklonia maxima*. 5th International Temperate Reef Symposium, Cape Town.
- ATKINSON, L., MAYFIELD S. & BRANCH G.M. 2000. Movement patterns of the west-coast rock lobster *Jasus lalandii*. International Resource-management symposium, Windhoek, Namibia.
- BRANCH, G.M. 2000. Interplays between biological and physical factors on rocky shores. 6th indaba of volunteer rangers, Tsitsikamma.

- Branch, G.M. 2000. Predicting the characteristics of alien invasives. Best Management Practices for Preventing and Controlling Invasive Alien Species. Kirstenbosch 22-24 Feb., 2000.
- *BRANCH, G.M. 2001. Priority actions for marine conservation. Conservation International Conference on Defying Nature's End. Pasadena, May 2001.
- *BRANCH, G.M. 2001. Objectives and indicators of success of Marine Protected areas. Management Effectiveness of Marine Protected Areas. Zanzibar, IUCN Workshop. November 2001. Invited speaker and facilitator.
- BRANCH, GM, HAUCK, M and M SOWMAN. 2002. Testing the validity of conditions believed to favour co-management of marine fisheries. South African marine Science Symposium, Swakopmund, July 2002.
- STEFFANI, N. and GM BRANCH. 2002. Will the alien mussel *Mytilus galloprovincialis* cause local extinction of the indigenous limpet *Scutellastra argenvillei*? South African marine Science Symposium, Swakopmund, July 2002.
- SIEBERT, T., ANGEL, A. and G.M. BRANCH 2002. Causes of rarity and habitat restriction of eelgrass and an endemic, threatened limpet *Siphonaria compressa*. Plenary paper, South African marine Science Symposium, Swakopmund, July 2002.
- SINK, K., BRANCH, G.M. and J.M. HARRIS. 2002. A hierarchical analysis of abiotic determinants and harvesting impacts in the rocky intertidal of KwaZulu-Natal, South Africa. South African marine Science Symposium, Swakopmund, July 2002.
- ATKINSON, L., G.M. BRANCH and A. COCKCROFT. 2002. Acoustic tracking of the west coast rock lobster, *Jasus lalandii*. Plenary paper, South African marine Science Symposium, Swakopmund, July 2002.
- BRANCH, G.M. 2003. Marine protected areas: what they can and can't achieve. 6th International Temperate Reef Symposium, Christchurch.
- BRANCH, G.M. and STEFFANI, N. 2003. Predicting the effects of aliens species – the case history of *Mytilus galloprovincialis* in South Africa. 6th International Temperate Reef Symposium, Christchurch.
- BRANCH, G.M and N. STEFFANI 2003. How good are we at predicting the effects of alien species? The case of *Mytilus galloprovincialis* versus endemic limpets. International Meeting on Limpet Biology, Isle of Cumbrae, Scotland.
- BRANCH, G.M., T. SIEBERT and A. ANGEL. 2003. Causes of rarity and range-restriction in the limpet *Siphonaria compressa*: the role of interactions between eelgrass and sandprawns. International Meeting on Limpet Biology, Isle of Cumbrae, Scotland.
- JEAN M HARRIS, SANDILE SIBIYA, GEORGE BRANCH, SCOTTY KYLE, RONNIE BRERETON-STILES, AND GUGU ZAMA 2003. Integrating traditional fisheries in marine protected area management: co-management cases studies in South Africa. "Marine Reserves: a global perspective" session of SCB Annual meeting: 28 June – 2 July, 2003. Duluth, Minnesota.
- BRANCH, G.M. 2003. Zoning the Atlantic. Working Group on Protected Areas and Zoning. Conservation International Meeting: Defying Ocean's End, Los Cabos, Mexico.
- BRANCH G.M. 2003. Predicting the future: impacts on rocky shores. International Conference on Environmental Futures; Zurich, Switzerland. March 2003.
- BRANCH, G.M. 2003. Recent developments in the science of MPAs. State of marine protected areas, Cape Town, June 2003.
- AMIEN, S., T. PESCHAK & G.M. BRANCH 2003. Baboons on the beach. Joint Conference of SASAQS and ZSSA, Cape Town, June-July 2003.
- KRUGER, N, GRIFFITHS, C.L., FIELD, J.G. & BRANCH, G.M. 2003. Long-term changes in the benthic macrofauna of Saldanha Bay. Joint Conference of SASAQS and ZSSA, Cape Town, June-July 2003.
- BRANCH, G.M. and STEFFANI, C.N., 2004. Can we predict the effects of alien species? The case of *Mytilus galloprovincialis* in South Africa. Southern Connections. 4th international conference, Cape Town, January 2004.
- REAUGH, K., HARRIS, J.M. and BRANCH G.M., 2004. How connected are the rocky ledges on the northern KwaZulu-Natal coast? Preliminary results from an integration of oceanography, larval dispersal and recruitment of the brown mussel, *Perna perna*. Southern Connections. 4th international conference, Cape Town, January 2004.
- WIETERS, E. and BRANCH G.M. 2004. Variation in upwelling intensity and intertidal community structure in South Africa and Chile. Southern Connections. 4th international conference, Cape Town, January 2004.

- BRANCH, GM 2004. Biological interactions among rock lobsters, urchins, abalone and kelp: implications for ecosystem management. Ecosystem Research and Management of Fisheries, Australian Society for Fish Biology, Adelaide, South Australia: September 2004.
- Reaugh, K, JM Harris, GM Branch and G Hough. Connectivity of rocky ledges in north-eastern South Africa: integrating oceanography with the larval dispersal and settlement of the brown mussel, *Perna Perna*. Western Indian Ocean Marine Science Association conference, 2005.
- XAVIER, BM, Branch GM and Wieters, E. 2005. Mesoscale variation in the intensity of upwelling and growth of the invasive mussel *Mytilus galloprovincialis* along the west coast of South Africa. Congresso Portuges de Malacologia, Portugal.
- Sandile Sibiyi, Jean Harris, Gugu Zama, Scotty Kyle, Vici Napier and George M Branch. 2005. Co-management of subsistence fisheries in South Africa: cases studies and success factors. Fourth WIOMSA Scientific Symposium, Mauritius.
- Petersen, S. and Branch GM. Is flipper-banding of penguins a threat? International Penguin Conference, Ushuia, Terre del Fuego, Sept 2004.
- Pillay, D., Forbes, AT and Branch GM. The influence of bioturbation by the sandprawn *Callianassa kraussi* on the settlement of macrobenthic larvae: an alternative perspective on structuring by bioturbators. South African Marine Science Symposium, Durban, July 2005.
- Pfaff, MC, Hiebenthal C, Branch GM, Molis M and Wahl, M. The interactive effects of disturbance and productivity on diversity and biomass: different mechanisms of co-existence in rocky intertidal communities. South African Marine Science Symposium, Durban, July 2005.
- Branch GM, Pfaff M MC and Wieters E. Recruitment of intertidal rocky shores: does upwelling drive the temporal and spatial patterns of barnacle and mussel settlement? South African Marine Science Symposium, Durban, July 2005.
- Lawrence CM, Harris JM and Branch GM. A biodiversity assessment of benthic community structure and species composition of subtidal reef habitats in KwaZulu-Natal. South African Marine Science Symposium, Durban, July 2005.
- Blamey, L and Branch GM. Intertidal community structure of rocky shores relative to wave action: one habitat or many? Implications for conservation planning. South African Marine Science Symposium, Durban, July 2005.
- Reaugh, KE, Harris JM, Branch GM. Five years of intertidal mussel settlement around the coast of southern Africa. South African Marine Science Symposium, Durban, July 2005.
- Peschak TP and Branch GM. Spatial and temporal trends in abalone poaching along the southwest coast of South Africa 1997-2003. South African Marine Science Symposium, Durban, July 2005.
- Robinson TB, Branch and Griffiths CL. Harvesting the alien mussel *Mytilus galloprovincialis*: effects on natural populations. South African Marine Science Symposium, Durban, July 2005.
- Maletzky, E, Brouwer, S and Branch GM. The effects of oxygen deficiency, turbidity, temperature and hydrogen sulphide on the African west coast rock lobster *Jasus lalandii*. Possible premonitions for diamond dredge mining along the west coast. South African Marine Science Symposium, Durban, July 2005.
- Greengrass, CL, Groeneveld JC and Branch GM. A preliminary study leading towards commercial harvesting of the west coast rock lobster (*Jasus lalandii*) pueruli for ongrowing purposes. South African Marine Science Symposium, Durban, July 2005.
- Reaugh KE, Hough G, Harris JM and Branch GM. Videography – a new low-coast tool for analysis of surface-water movements for coastal Zone research and management. South African Marine Science Symposium, Durban, July 2005.
- Branch, G.M. 2006. Ecosystem Approaches to fisheries management. WWF-SA National Environmental Advisory Council Conference, Stellenbosch, January 2006. Invited speaker.
- Branch, G.M. 2006. Education and marine ecology. Marine and Coastal Educators Network. February 2006. Keynote speaker.

A. RESEARCH CAPACITY DEVELOPMENT:

65 postgraduate students have graduated under my supervision, including 15 in the last 7 years. They have published 165 papers from their theses and an additional 946 papers of which I am aware. Nine of my 25 MSc students (36%) graduated with distinction (normally awarded to about the top 15% of MSc theses). Several have risen to positions of prominence or received distinctions, including G Cliff (Director of Natal Shark Research Unit); J Henshel (Director, Desert Ecology Research Unit, Namibia); S Pillar (Senior scientific officer and editor of South African Journal of Marine Science); R Wynberg (south African representative to Rio Convention); CG Attwood (Head of Biodiversity Section, Marine and Coastal Management (MCM), responsibility for MPAs); ML Branch (recipient of Zoological Society bronze medal and life-time award for contributions to environmental education; author of 5 books); Craig Smith (Head of Coastal Invertebrate Section, MCM); JA Day, (Head of Department of Zoology, UCT); CD McQuaid (Head of Department of Zoology, Rhodes University); RJ Griffiths (editor of Wildlife Society Junior magazine); L Beckley (senior scientific officer ORI, and now Associate Professor at Murdoch); G Williams (California Academy of Sciences); A Barkai (recipient of I&J award for best marine PhD thesis; now co-director of Olroc); JM Harris (In charge of coastal management, EKZN Wildlife; recipient of Pew Fellowship); AL Cohen (Smithsonian Institute); S Mayfield (senior scientist in charge of abalone, CSIRO Tasmania); J Groeneveld (Rock Lobster Section, MCM); R Bustamante, Director of Marine Research, Charles Darwin Research Station, Galapagos, and now senior scientific officer, CSIRO Brisbane; recipient of Pew Fellowship).

C. COOPERATIVE RESEARCH:

Among my current research projects, many involve collaboration. Research on MPAs involves international collaboration with people such as Callum Roberts (University of York) and Jane Lubchenco (Oregon State University) via the NCEAS programme on MPAs at Santa Barbara. I also collaborated with Professor Bruce Menge of Oregon State University in writing a chapter of Rocky-shore communities. I was awarded a Mellon Foundation grant that allows collaborative research on rocky shores, and have used this to foster connections with Chile (Prof Sergio Navarette, Santiago) and will be establishing further connections with Profs Jane Lubchenco and Bruce Menge. Collaborative work with a range of scientists from five countries led to the production of a Biodiversity Vision for Galapagos, including a book documenting future strategy. Participation in the Conservation International meeting in Pasadena, 2001, also led to a collaborative strategy for conserving world biodiversity. On a national level, many of my programmes involve members of Marine and Coastal Management in Cape Town and Ezemvelo KwaZulu-Natal Wildlife, including joint supervision of students.

D. STAFF DEVELOPMENT:

As head of the department of zoology, University of Cape Town, I was responsible for the appointment of the department's first black academic, and I adopted a policy of equal opportunity for the sexes, so that six of the staff of the (then) 14 academics were female. One of my research programmes (a WWF-funded programme on mussel utilisation, led by Jean Harris) has a strong element of human empowerment, actively involving local communities of previously disadvantaged people in co-management. This has resulted in the training of 9 black people, most of them female, in committee procedures and a further 12 as researchers and monitors. Many of these have since been snapped up by authorities concerned with marine management.

E. DEVELOPMENT OF RESEARCH AT HISTORICALLY DISADVANTAGED INSTITUTIONS:

I have participated in or led three research projects involving collaborative programmes with Historically Black Universities (University of Transkei and University of the Western Cape). In my capacity as Chair of the Access Rights Technical Committee I had the privilege of collaborating with two distinguished black academics, Dr Zunaid Moola (CPA) and Prof Paulus Zulu (University of Natal). My participation as vice chair of the Subsistence Fisheries Task Group involved collaboration with people of all races and of both sexes, and led to my co-authoring five papers with members of three historically disadvantaged universities and technical colleges. Contributions to subsistence fisheries have resulted in the recognition and formalization of these previously marginalized people.

F. ACTION IN RELATION TO SUPERVISION OF STUDENTS:

40% of my students are female. I have supervised two non-white postgraduates (one of whom has risen to a position of responsibility in Marine and Coastal Management), and five non-white Honours students. One of my current MSc thesis students is Coloured and one PhD student is black. I participate in both the MSc in Applied Marine Science and (to a smaller extent) in the MSc Conservation Biology, both of which train large numbers of students from previously disadvantaged backgrounds. Members of my NRF team, namely Dr Colleen Moloney and Prof JG Field have been active leaders in promoting the former course and training black students.

G. CO-OPERATIVE RESEARCH WITH INDUSTRY:

Two research programmes on the impacts of diamond mining on rocky shores, subtidal benthos and rock lobsters were funded by NamDeb. Two papers describing this work have been published. Separate but complementary programmes on rock lobsters and abalone have direct relevance to these industries. I was also a member of the Two Oceans Biological Advisory Committee, 1994-1995.

H. FOSTERING AN ENTREPRENEURIAL CULTURE IN EDUCATIONAL INSTITUTIONS:

I have actively encouraged my students to become involved in contracts relating to marine management, and 12 contracts have been completed in the past five years, including work on oil spills, diamond mining, harbour construction and freshwater management. In each of the past two years these contracts have exceeded R1 000 000. I was a member of the steering committee for the Centre for Marine Studies which attracts and distributes such contracts. Students in our unit have now formed their own private company ('Anchor') to handle such work. Several past students have entered private companies or gained contracts as environmental consultants or scientific advisors. Many subsidise their studies by writing scientific articles for the press and popular magazines. I believe these are all signs that an entrepreneurial spirit is being fostered in our team of students.