

## SEA TENURE AND THE MANAGEMENT OF LIVING MARINE RESOURCES IN PAPUA NEW GUINEA

David Hyndman  
*University of Queensland*

### **Customary Marine Tenure**

Use of coastal waters in Papua New Guinea takes place under a great diversity of locally defined, informal, exclusive, communal, relatively closed, or even private tenure arrangements in what has come to be labeled "sea tenure" or customary marine tenure (CMT) (Anell 1955; Baines 1989; Balfour 1913; Cranstone 1972; Kearney 1975, 1977; Moore 1977; Narokobi 1984; Quinn, Kojis, and Warpeha n.d.; Spring 1982; Tenakanai 1986). CMT in Papua New Guinea includes mixtures of exclusive individual and public-access traditions with ownership tied to specific environments, species, or technology--or to some combination of all three (Carrier 1981, 1982a, 1982b; Carrier and Carrier 1983, 1989). CMT community membership is small, interrelated and bound by cultural rules that specify who has access to resources (Akimichi 1981; Bergin 1983; Chapman 1987; Cordell 1984; Couper 1973; Johannes 1978b, 1982a, 1989a, 1989b; Johannes and MacFarlane 1986, 1991; Rodman 1989; Ruddle and Akimichi 1984; Schoeffel 1985; South Pacific Commission 1988).

Although sea tenure is vital to over 400,000 ethnically diverse coastal peoples of Papua New Guinea, the fate of these CMT resource-management systems, especially in the transboundary Torres Strait region, are increasingly threatened by commoditized fisheries and contentious mining and oil projects. Advocacy expressed in this article for maintaining tradition-based sea tenure in Papua New Guinea stems from my own

long-standing anthropological research association with the Wopkaimin landowners around the Ok Tedi mining project, located in the Fly River headwaters (Hyndman 1991b). Environmental disaster from the Ok Tedi project ramifies throughout the Fly River socioecological region (Hyndman 1991a). Refugees from pollution there are migrating to Daru, the Western Province administrative center situated below the Fly estuary; and coastal fisheries are threatened. Moreover, the need for a baseline appraisal of sea tenure in contemporary Papua New Guinea became apparent at a 1990 conference, "Sustainable Development for the Traditional Inhabitants of the Torres Strait Region," sponsored by the Australian Great Barrier Reef Marine Park Authority (Lawrence and Cansfield-Smith 1991). This article, then, is intended for CMT researchers and policymakers. Versions have been presented to a World Wildlife Fund review for Papua New Guinea (Hyndman 1992); to John Cordell, director of the Torres Strait transboundary indigenous conflict, resolution project; and to the Fourth Annual Common Property Conference held in Manila in June 1993.

Issues of conservation, common property, and identity inform the following analysis of CMT in Papua New Guinea and the Melanesian transboundary Torres Strait Islands. The existing ethnographic record on sea tenure in Papua New Guinea is shown to clearly include systems of informal, closed, communal, collectively-held coastal marine property. These customs carry special legitimacy that can only be imposed from within by a group on its members. Sea-tenure estates are not broken-down traditions but living customs, which have always transformed and related to basic resource-management tasks. They are diverse, flexible, dynamic, and capable of regulating many kinds of subsistence and commercial activities associated with marine fishing, hunting, and gathering. The article concludes that CMT systems are viable, if fragile and still incompletely understood, limited-entry solutions to managing living marine resources.

#### *Customary Sea Tenure in the Torres Strait Islands*

Subsistence, trade, politics, and identity in the Torres Strait flow from the sea (Cordell 1991a, 1991b; Cordell and Fitzpatrick 1987; Harris 1977; Marsh 1986; Marsh and Saafeld 1991; Miller and Limpus 1991; Nietschmann 1989; Olewale and Sebu 1982). A century ago the Cambridge Anthropological Expedition noted the Islanders' intricate system of marine natural history knowledge and use. Islanders assert exclusive ownership of islands, waters, and reefs between Cape York Peninsula

and the sea territories of the Kiwai and other southwest coastal Papuan peoples (Nietschmann and Nietschmann 1981; Nietschmann 1989). In addition to Islanders' regard for the Strait as a whole being their territory, each group holds exclusive rights over fringing and adjacent reefs and intervening waters. These are home-island claims that are partitioned into areas controlled by specific clans and then further subdivided into individually owned zones. Today, named marine-tenure boundaries are still resilient and held in place through culturally defined cognitive maps, even though in some places occupation and resource use beyond the home reefs may be attenuated (Fitzpatrick 1991a, 1991b; Johannes and MacFarlane 1990).

#### *Customary Sea Tenure in Papua New Guinea*

Well-developed ownership of marine ecosystems exist along the south coast of Papua New Guinea (Frusher and Subam 1981; Gaigo 1977, 1982; Haines 1978/1979; Hudson 1986a, 1986b; Kwan 1991; Pulseford 1975; Swadling 1977). Papuan maritime geography is best documented among the Kiwai (Ely 1987; Landtman 1927; Lawrence 1991). Kiwai clans own land, mangrove systems, and reefs. Dugong and turtle hunting are preeminent in subsistence and identity construction among the Kiwai.

Sea tenure is also well documented among peoples along the north coast and the islands off the mainland of Papua New Guinea. From the archipelagic waters surrounding the island groups are reports for the Massim area of Milne Bay (Malinowski 1918, 1922; Lauer 1970; Williamson 1989), for New Ireland and New Britain in the Bismarck Sea (Bell 1953-1954; Panoff 1969-1970), and for Ponam Island off Manus (Carrier 1981; MacLean 1978). From the mainland are reports for the Siassi people (Pomponio 1992), the seafaring Sepiks (Lipset 1985), and other peoples of the north coast (Cragg 1981, 1982; Keurs 1989).

Complex CMT systems are found among Ponam Islanders and the Siassi. Various Ponam Islander patrilineages own different areas of marine space, resources, and exploitative technology (Carrier and Carrier 1983). Under the Ponam system of overlapping rights, a patrilineage owning a particular technology can use it in another patrilineage's domain if permission for the target species is obtained and the various right holders are each allocated a portion of the catch. A particularly intricate system of tradition and place characterizes Siassi sea tenure (Pomponio 1992). CMT among the Ponam Islanders and the Siassi is embedded in gift economies and kinship-ordered modes of production.

Since Malinowski's classic *Argonauts of the Western Pacific* (1922), CMT among Trobriand Islanders has been shown to conclusively exist and to be embedded in factors other than biological resources. When Trobriand Islanders fought over sea tenure, it was not for scarce resources but for the status of participation in the gift economy (Malinowski 1918). Among the Trobriand Islanders, CMT is both resource and territory based. Coastal village CMT considers coastal areas to be connected to the land, and maritime ownership includes beaches, estuaries, coastal waters, and fisheries resources. Living and nonliving resource exploitation, whether subsistence or commercial, is exclusive to the village community (Williamson 1989). Labai villagers, moreover, claim exclusive reef ownership when mullet schools and Kevatariya fishermen own distinct portions of reef claimed as "our gardens" (Williamson 1989). The importance of fishing in the Trobriand economy with various right holders each allocated a portion of the catch has long been noted (Malinowski 1918); and Massim peoples generally spend 17 percent of their work time fishing (Moulik 1973).

The ethnographic record has generally undervalued the use of marine resources by coastal maritime peoples (Pernetta and Hill 1983). Along the western Papuan coast the average daily subsistence catch per person is around 80 grams of fish and 80 grams of crabs and prawns (Haines 1982). Exploitation of marine resources is also extensive in coastal New Ireland (Wright 1990) and New Britain (Epstein 1963; Harding 1967). On New Ireland, Tigak Islanders eat on average 23.4 grams whole weight per day of locally caught fish (Wright 1990), while along the West New Britain coast 11.4 grams of fresh fish is consumed per person per day (Green and Sanders 1978). Fish accounts for 2 percent by weight of subsistence production among Karkar Islanders on the north coast (Norgan and Durnin 1974).

### **Legal Ownership of the Sea and Living Resources**

A process of dispossession and disruption of indigenous fishing cultures is a matter of historic record in many parts of Melanesia. Legislating commons status for inshore fisheries was a convenient maneuver by colonists seeking to displace or nullify marine-tenure claims of indigenous peoples. Johannes points out that "the value of marine tenure [in Oceania] was not generally appreciated by Western colonisers. It not only ran counter to the tradition of freedom of the seas which they assumed to have a universal validity, but it also interfered with their desire to exploit the islands' marine resources--a right they tended to

take for granted as soon as they planted their flags. Colonial governments often passed laws that weakened or abolished marine tenure” (1978b:358-359).

In Papua New Guinea, however, colonial administrations implicitly recognized customary maritime rights. German and British colonial administrators acknowledged customary fishing rights (McCubbery 1969). The commodity trade for pearls, trochus shells and *bêche-de-mer* was covered by the Colonial Ordinances of British New Guinea from 1891. The Fisheries Ordinance of the Territory of New Guinea enacted by the British further recognized customary sea tenure with the provision, “this Ordinance shall not apply to any native fishing in waters in which by native custom he has any rights of fishing” (Williamson 1989:40). Later, the colonial Australian Pearl-Shell and *Bêche-de-mer* Ordinance of 1952-1953 provided coastal peoples with the exclusive right to all marine animals, except whales, to a distance of 800 meters offshore (Williamson 1989).

After independence Papua New Guinea signed the 1982 United Nations Convention on the Law of the Sea, which allows claim for a territorial sea of up to 12 nautical miles, an archipelagic sea with exclusive ownership of all marine resources, and a 200-nautical-mile Exclusive Economic Zone (EEZ). In addition to the Law of the Sea Convention, Papua New Guinea has signed other international treaties. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) controls the taking and export of certain maritime species customarily acquired for subsistence and exchange by coastal peoples (Williamson 1989). Australia and Papua New Guinea cater for the Torres Strait Islanders and the Kiwai and other southwest-coast Papuans in a unique international treaty signed in 1978. Article 10 of this treaty establishes a Protected Zone in which the fishing practices of Islanders, the Kiwai, and other traditional owners are protected. Implementing the treaty is intended to accommodate indigenous sea tenure and provide for continuity of the subsistence fishery.

Papua New Guinea also enacted, in 1977, domestic ocean-resources and marine-territory laws collectively known as the National Seas Legislation. According to Williamson (1989), however, nothing in the act establishes the division of rights to Papua New Guinea waters within the state. Neither sovereignty under Section 2(2) of the Constitution nor regulation rights within internal waters through the Fisheries Act expressly confer state ownership rights to coastal waters. Beach areas belong to the state through the Mining Act. The Fisheries Act regulates the commercial fishery but does not reserve to the state fisheries owner-

ship. It is Section 5 of the Customs Recognition Act that implicitly recognizes the preexistence of customary rights to coastal-water fisheries according to the customs of the different indigenous peoples. These customary coastal-waters and fisheries rights can be interpreted to protect property from unjust deprivation by Section 53(1) of the Constitution (Williamson 1989).

At present there are three statutes that may be used to establish protected areas in Papua New Guinea. These are the National Parks, Conservation Areas, and Fauna (Protection and Control) Acts (Eaton 1985). The objectives of the National Parks Act (1982) is "to provide for the preservation of the environment and of the national cultural inheritance by . . . the conservation of sites and areas having particular biological, topographical, geographical, historical, scientific or social importance." The Conservation Areas Act (1978) has similar objectives; however, conservation areas established under this legislation do not have to be on public land but can be developed on land or marine space that is privately owned or held under customary tenure. Moreover, it includes provisions for a National Conservation Council to advise on the selection and management of conservation areas and "to encourage public interest in and knowledge of conservation areas and conservation generally." The Fauna (Protection and Control) Act (1966) is mainly concerned with protection through sanctuaries, protected areas, and wildlife-management areas of certain species of wildlife considered to be endangered. In sanctuaries all wildlife is protected except for certain specified animals that may be hunted. In protected areas certain specified fauna is protected and hunting of other types of wildlife is allowed. Wildlife-management areas represent an attempt to involve customary land and marine owners in the control of living-resource exploitation (Eaton 1985).

About 97 percent of Papua New Guinea is still held under customary land tenure (Eaton 1985; Pulea 1985; Williamson 1989). Only 1.4 million hectares of land, 3 percent of the total area, has been alienated from customary tenure. Most of this is held by the government, but 160,000 hectares are freehold and 340,000 hectares are leased to private interests (Eaton 1985). During the past decade it was estimated that there were 390,000 coastal people, or 13 percent of the total population, who exercised customary rights and use of marine resources (Frielink 1983). As previously discussed, land and sea tenure and ownership of resources are vested in kinship groups and use rights are inherited from a common ancestor. Land and sea tenure provides people with more than subsistence; it gives them their identity and constitutes the basis of their social relationships.

The relationship of indigenous CMT systems to the national government is analogous to the Law of the Sea Convention with respect to the EEZ (Nietschmann and Ely 1987; Williamson 1989). Jurisdiction over navigation, criminal activities, pollution, and environmental matters lies with the government, but as in the EEZ of the coastal state, ownership rights to living resources lie with the indigenous owners of use rights over the reefs. The granting of fishing licenses by the government without the consent of the indigenous owners of the reef would represent uncompensated expropriation (Williamson 1989). CMT ownership of marine space and species provides a strong cultural and historical base for present-day EEZ claims. When almost all of the tuna fishing grounds in the Pacific were transferred to EEZs, the U.S. fishermen became resource pirates until negotiating an appropriate fisheries treaty with the Forum Fishing Agency in 1986 (Nietschmann and Ely 1987).

### **The Future for CMT Management of Living Resources**

In analyzing the potential and desirability of integrating Melanesian CMT into contemporary fisheries- and marine-management frameworks in the transboundary Torres Strait region, Cordell suggests that the following three questions stand out (1992:122): (1) What happens to CMT patterns during the transition from subsistence to commercial economies? (2) What are the resource-management and biological-conservation impacts of CMT? (3) What uses, if any, can be made of CMT systems that work to define user and access rights--in essence, to preserve the social order--rather than the balance of nature? These questions raise the critical ethical issues in CMT research: To what extent, if at all, do outsiders (anthropologists included) have the right to speak about and represent indigenous peoples' sea-tenure systems? The highest standards of professional accountability must apply and CMT studies should proceed only with the consent and active collaboration of the indigenous peoples involved. The peoples themselves should have the final say about what constitutes their CMT systems.

On the first question, Haines (1982), Carrier (1987), Johannes and MacFarlane (1992), and Polunin (1990) have concluded that CMT offers little potential to mitigate change and resolve conflict. Such a contentious conclusion appears premature given that these Melanesian sea-tenure estates, including the Marovo *puava* in the adjacent Solomons (Hviding 1988), remain some of the most extensive and sophisticated traditional knowledge systems in Oceania for spatially managing and socially regulating coral-reef fisheries (Clarke 1990). Wright (1990) takes the opposite position and describes CMT systems in Papua New

Guinea that have allowed the successful negotiation of the transition to modernity through commercial fishing ventures and has suggested that directions for utilizing CMT in the development of marine resources in Papua New Guinea may be found in the judicial system used at present to resolve village disputes over land rights.

On the second question, Johannes (1982b), Clarke (1990), and Nietschmann (1989) have already shown that through closed areas and seasons, food taboos, and game restrictions, Melanesian CMT systems in Papua New Guinea and the Torres Strait have enhanced species conservation. Carrier (1987), on the other hand, cautions that Ponam Islander limited-entry sea-tenure systems did not necessarily conserve resources and that it is dangerous to presume intended or Unintended conservation when one finds a limited-entry CMT system in Papua New Guinea. Indigenous peoples' choices in aquatic-resource use in Papua New Guinea and the transboundary Torres Strait Islands cannot be explained by open-access, common-property models and the terminology itself is misleading and inappropriate (Carrier 1987; Nietschmann 1989). Open-access common property assumes a model of optimization, that people act out of self-interest alone without regard for community. Lack of community designates the open-access commons but under CMT, sea-tenure holders in Papua New Guinea are well-defined peoples who do not lack use rights.

On the last question, what these CMT systems really do is consolidate a people's control over fishing grounds and defend against encroachment. Management utility of CMT systems should not stand or fall merely on the basis of a conservation test. Although it is doubtful that sea-tenure systems were designed purely with conservation in mind (Carrier 1987; Polunin 1990), they do represent important attempts by indigenous peoples to deal with problems of managing resources by controlling and restricting access (Cordell 1989, 1992). As Carrier points out, "because of the way reputation was generated, however, the scarce resource was not fish but ownership itself, for this is what made it possible to be generous" (1987: 164). Melanesian CMT systems preserve the social order by embedding aquatic resources in the gift economy and the kinship mode of production.

More research will enable policymakers to go beyond documenting general features of CMTs to specifying how they can be integrated with contemporary systems of marine use. In Papua New Guinea indigenous owners of CMT systems can become involved in the protection of their living land and marine resources through wildlife-management areas. Of the eleven wildlife-management areas established, the first and larg-



est is Tonda, with 5,900 square kilometers in southwest Papua. The management committee regulates outsider hunting and fishing with licenses and royalties paid on deer, duck, and fish. Maza is the only completely marine management area and covers 184,230 hectares in the transboundary Torres Strait Islands region. Indigenous peoples, while having to contend with impositions on their commoditization of turtle, dugong, and fish catches, have expressed concerns over exploitation by commercial fishermen from outside the protected area. The great advantage of wildlife-management areas is that sea-tenure and land-tenure rights are retained by indigenous owners and CMT management is encouraged. The aim is sustainable utilization of renewable living resources.

Government policies and CMT systems need to accommodate one another. What seems the imperative is the principle and obligation of the Papua New Guinea government to uphold indigenous peoples' rights and controls over their ancestral marine domains. It is impossible to isolate the sea from the total fabric of maritime economy and culture. It is through customary sea tenure that Papua New Guinea's maritime peoples are progressing with past customs to forge their cultural identity in the modern world.

### LITERATURE CITED

Akimichi, T.

1981 "Perception and Function: Traditional Resource Management in the Pacific Islands." *Resource Management and Optimization* 1 (4): 361-378.

Anell, B.

1955 *Contributions to the History of Fishing in the South Seas*. Uppsala, Sweden: Almqvist and Wiksell.

Baines, G.

1989 "Traditional Resource Management in the Melanesian South Pacific: A Development Dilemma." In *Common Property Resources: Ecology and Community-based Sustainable Development*, ed. F. Berkes, 273-295. London: Bellhaven Press.

Balfour, H.

1913 "Kite Fishing." In *Essays and Studies Presented to William Ridgeway on His Sixtieth Birthday*, ed. E. C. Quiggin, 583-608. Cambridge: Cambridge University Press.

Bell, F.

1953- "Land Tenure in Tanga." *Oceania* 24:28-57.  
1954

- Bergin, A.  
1983 "Fisheries in the South Pacific." *Asia Pacific Quarterly* 22:20-32.
- Carrier, J.  
1981 "Ownership of Productive Resources on Ponam Island, Manus Province." *Journal de la Société des Océanistes* 37:205-217.  
1982a "Conservation and Conceptions of the Environment: A Manus Case Study." In *Traditional Conservation in Papua New Guinea: Implications for Today*, 39-43. See Mourata, Pernetta, and Heaney 1982.  
1982b "Fishing Practices on Ponam Island (Manus Province), Papua New Guinea," *Anthropos* 77:904-915.  
1987 "Marine Tenure and Conservation in Papua New Guinea." In *The Question of the Commons: The Culture and Ecology of Communal Resources*, ed. B. McCay and J. Acheson, 142-167. Tucson: University of Arizona Press.
- Carrier, J., and A. Carrier  
1983 "Profitless Property: Marine Ownership and Access to Wealth on Ponam Island, Manus Province." *Ethnology* 22: 133-151.  
1989 "Marine Tenure and Economic Reward on Ponam Island, Manus Province." In *A Sea of Small Boats*, 94-121. See Cordell 1989.
- Chapman, M.  
1987 "Traditional Political Structure and Conservation in Oceania." *Ambio* 16 (4): 201-205.
- Clarke, W. C.  
1990 "Learning from the Past: Traditional Knowledge and Sustainable Development." *The Contemporary Pacific* 2 (2): 233-253.
- Cordell, J.  
1984 "Defending Customary Inshore Sea Rights." In *Maritime Institutions in the Western Pacific*, 301-326. See Ruddle and Akimichi 1984.  
1991a "Lines in the Water: Sea Tenure as Custom Today in Western Oceania." In *Proceedings of the Torres Strait Baseline Study Conference*, 507-516. See Lawrence and Cansfield-Smith 1991.  
1991b "Negotiating Sea Rights." *Cultural Survival Quarterly* 15 (2): 5-10.  
1992 *Managing Sea Country: Tenure and Sustainability of Aboriginal and Torres Strait Islander Marine Resources*. Canberra: Report on Indigenous Fishing, Ecological Sustainable Development Fisheries Working Group.
- Cordell, J., ed.  
1989 *A Sea of Small Boats*. Cambridge, Massachusetts: Cultural Survival.
- Cordell, J., and J. Fitzpatrick  
1987 "Cultural Identity and the Sea in Torres Strait." *Cultural Survival Quarterly* 11 (2): 15-17.
- Couper, A.  
1973 "Islanders at Sea: Change and Maritime Economies of the Pacific." In *The Pacific in Transition*, ed. H. Brookfield, 229-247. New York: St. Martin's Press.
- Cragg, S.  
1981 *The Subsistence Economy of Umboi Island with Special Reference to the Role of Mangrove Swamps*. Waigani: Office of Environment and Conservation.

- 1982 *Coastal Resources and the Umboi Logging Project*. Waigani: Office of Environment and Conservation.
- Cranstone, B.  
 1972 "Fishing." In *The Encyclopaedia of Papua New Guinea*, ed. P. Ryan, 425-427. Carlton: Melbourne University Press.
- Eaton, P.  
 1985 "Land Tenure and Conservation: Protected Areas in the South Pacific." *South Pacific Regional Environmental Programme/Topic Review 17*. Noumea: South Pacific Commission.
- Epstein, A.  
 1963 "The Economy of Modern Matupit: Continuity and Change in the Gazelle Peninsula, New Britain." *Oceania* 33:182-215.
- Ely, T.  
 1987 "Hunters of the Reefs: The Marine Geography of the Kiwai, Papua New Guinea." Ph.D. thesis, Department of Geography, University of California, Berkeley.
- Fitzpatrick, J.  
 1991a "Home Reef Fisheries Development: A Report from Torres Strait." *Cultural Survival Quarterly* 5 (2): 18-20.  
 1991b "Maza: A Legend about Culture and the Sea." In *Proceedings of the Torres Strait Baseline Study Conference*, 335-347. See Lawrence and Cansfield-Smith 1991.
- Frielink, A.  
 1983 *The Coastal Rural Population of Papua New Guinea*. Report No. 83-11. Port Moresby: Department of Primary Industry, Fisheries Division.
- Frusher, S., and S. Subam  
 1981 "Traditional Fishing Methods and Practices in the Northern Gulf of Papua." *Harvest* 7: 15-158.
- Gaigo, B.  
 1977 "Present Day Fishing Practices in Tatana Village." In *The Melanesian Environment*, ed. J. Winslow, 176-181. Canberra: Australian National University Press.  
 1982 "Past and Present Fishing Practices among the People of Tatana Village, Port Moresby." In *Traditional Conservation in Papua New Guinea: Implications for Today*, 301-302. See Mourata, Pernetta, and Heaney 1982.
- Green, W., and H. Sanders  
 1979 *Manus Province Tuna Cannery Environmental Study*. Waigani: Office of Environment and Conservation.
- Haines, A.  
 1978/ 1979 "The Subsistence Fishery of the Purari Delta." *Science in New Guinea* 6 (2): 80-95.  
 1982 "Traditional Concepts and Practices and Inland Fisheries Management." In *Traditional Conservation in Papua New Guinea: Implications for Today*, 279-291. See Mourata, Pernetta, and Heaney 1982.

- Haines, A., G. Williams, and D. Coates, eds.  
 1986 *Proceedings of the Torres Strait Fisheries Seminar, Port Moresby, 11-14 February, 1985*. Canberra: Australian Department of Primary Industry
- Harding, T.  
 1967 *Voyagers of the Vitiaz Strait: A Study of a New Guinea Trade System*. Seattle: University of Washington Press.
- Harris, D.  
 1977 "Subsistence Strategies Across the Torres Strait." In *Sunda and Sahul: Prehistoric Studies in Southeast Asia, Melanesia, and Australia*, ed. J. Golson, J. Allen, and R. Jones, 421-463. New York: Academic Press.
- Hudson, B.  
 1986a "Dugongs: Traditional Harvesting and Conservation." In *Endangered Species: Social, Scientific, and Legal Aspects in Australia and the South Pacific*, ed. S. Burgin, 188-205. Sydney: Total Environment Centre.  
 1986b "The Hunting of Dugong (Mammalia, Sirenia) at Daru, Papua New Guinea during 1978-82: Community Education Initiatives." In *Proceedings of the Torres Strait Fisheries Seminar, Port Moresby, 11-14 February, 1985*, 77-94. See Haines, Williams, and Coates 1986.
- Hviding, E.  
 1988 *Marine Tenure and Resource Development in Marovo Lagoon, Solomon Islands: Traditional Knowledge, Use, and Management of Marine Resources with Implications for Contemporary Development*. Honiara: Report to the South Pacific Forum Fisheries Agency.
- Hyndman, D.  
 1991a "Wopkaimin Landowners, the Ok Tedi Project, and the Creation of the Fly River Socio-ecological Region." In *Proceedings of the Torres Strait Baseline Study Conference*, 355-366. See Lawrence and Cansfield-Smith 1991.  
 1991b "Zipping Down the Fly on the Ok Tedi Project." In *Mining and Indigenous Peoples in Australasia*, ed. J. Connell and R. Howitt, 77-90. Sydney: Sydney University Press.  
 1992 "Customary Marine Tenure in Papua New Guinea." In *Review of the Management and Status of Protected Areas and Action Plan*. Appendix C.2, 20-28. Brisbane: World Wide Fund for Nature, WWF Project 4668, and Papua New Guinea Department of Environment and Conservation.
- Johannes, R.  
 1978a "Reef and Lagoon Tenure Systems in the Pacific." *South Pacific Bulletin* (4th Quarter): 31-34.  
 1978b "Traditional Marine Conservation Methods in Oceania and Their Demise." *Annual Review of Ecology and Systematics* 9:349-364.  
 1982a "Implications of Traditional Marine Resources Use for Coastal Fisheries Development in Papua New Guinea." In *Traditional Conservation in Papua New Guinea: Implications for Today*, 239-250. See Mourata, Pernetta, and Heaney 1982.  
 1982b "Traditional Conservation Methods and Protected Marine Areas in Oceania." *Ambio* 11 (5): 258-261.

- 1989a "Criteria for Determining the Value of Traditional Marine Tenure Systems in the Context of the Contemporary Marine Resource Management." In *Report of the Workshop on Customary Tenure, Traditional Resource Management, and Nature Conservation*. Noumea: South Pacific Commission.
- 1989b "Managing Small-scale Fisheries in Oceania: Unusual Constraints and Opportunities." In *Economics of Fisheries Management in the Pacific Islands Region*, ed. H. Campbell, K. Menz, and G. Waugh. Canberra: ACIAR Proceedings, no. 26.
- Johannes, R., and J. MacFarlane
- 1986 "Traditional Fishing Rights in the Torres Strait Islands." In *Proceedings of the Torres Strait Fisheries Seminar, Port Moresby, 11-14 February, 1985*, 31-37. See Haines, Williams, and Coates 1986.
- 1990 "Assessing Customary Marine Tenure Systems in the Context of Marine Resource Management: A Torres Strait Example." In *Traditional Marine Resource Management in the Pacific Basin: An Anthology*, 241-262. See Ruddle and Johannes 1990.
- 1991 "Torres Strait Traditional Fisheries Studies: Some Implications for Sustainable Development." In *Proceedings of the Torres Strait Baseline Study Conference*, 389-403. See Lawrence and Cansfield-Smith 1991.
- Johannes, R., and J. MacFarlane, eds.
- 1992 *Traditional Fishing in the Torres Strait Islands*. Hobart: CSIRO Division of Fisheries.
- Kearney, R.
- 1975 "Skipjack Tuna Fishing in Papua New Guinea." *Marine Fisheries Review* 37 (2): 5-8.
- 1977 "Prospects for Fisheries in Papua New Guinea." In *The Melanesian Environment*, ed. J. Winslow, 216-221. Canberra: Australian National University Press.
- Keurs, P.
- 1989 "Some Remarks on Seafaring, Trade, and Canoe-Construction of the Siassi of Mandok Island." *Baessler-Archiv* 37:373-400.
- Kwan, D.
- 1991 "The Artisanal Turtle Fishery in Daru, Papua New Guinea." In *Proceedings of the Torres Strait Baseline Study Conference*, 229-241. See Lawrence and Cansfield-Smith 1991.
- Landtman, G.
- 1927 *The Kiwai Papuans of British New Guinea*. London: MacMillan.
- Lauer, P.
- 1970 "Sailing with the Amphlett Islanders." *Journal of the Polynesian Society* 79 (4): 381-398.
- Lawrence, D.
- 1991 "The Subsistence Economy of the Kiwai-speaking People of the Southwest Coast of Papua New Guinea." In *Proceedings of the Torres Strait Baseline Study Conference*, 367-378. See Lawrence and Cansfield-Smith 1991.

- Lawrence, D., and T. Cansfield-Smith, eds.  
 1991 *Proceedings of the Torres Strait Baseline Study Conference*. Townsville: Great Barrier Reef Marine Park Authority.
- Lipset, D.  
 1985 "Seafaring Sepiks: Ecology, Warfare, and Prestige in Murik Trade." *Research in Economic Anthropology* 7:67-94.
- MacLean, J.  
 1978 "The Clam Gardens of Manus." *Harvest* 4: 160-163.
- Malinowski, B.  
 1918 "Fishing and Fishing Magic in the Trobriand Islands." *Man* 18:87-92.  
 1922 *Argonauts of the Western Pacific*. London: E. P. Dutton.
- Marsh, H.  
 1986 "The Status of the Dugong in Torres Strait." In *Proceedings of the Torres Strait Fisheries Seminar, Port Moresby, 11-14 February, 1985*, ed. A. Haines, G. Williams, and D. Coates, 53-76. Canberra: Australian Department of Primary Industry.
- Marsh, H., and K. Saafeld  
 1991 "The Status of Dugong in the Torres Strait." In *Proceedings of the Torres Strait Baseline Study Conference*, 187-195. See Lawrence and Cansfield-Smith 1991.
- McCubbery, C.  
 1969 "Marine Rights in the Pacific and New Guinea." In *Land Tenure and Indigenous Group Enterprise in Melanesia*, ed. R. Crocombe, 2. Third Waigani Seminar. Waigani: University of Papua New Guinea Press.
- Miller, J., and C. Limpus  
 1991 "Torres Strait Marine Turtle Resources." In *Proceedings of the Torres Strait Baseline Study Conference*, 213-227. See Lawrence and Cansfield-Smith 1991.
- Moore, R.  
 1977 "Management of Traditional Fisheries Resources in Papua New Guinea." In *Agriculture in the Tropics*, ed. B. Enys and T. Varhase, 147-154. Waigani: University of Papua New Guinea Press.
- Moulik, T.  
 1973 *Money, Motivation, and Cash-cropping*. Canberra: New Guinea Research Bulletin, no. 53.
- Mourata, L., J. Pernetta, and W. Heaney, eds.  
 1982 *Traditional Conservation in Papua New Guinea: Implications for Today*. Boroko: Institute of Applied Social and Economic Research.
- Narokobi, C.  
 1984 "The Law of the Sea and the South Pacific." *Ambio* 13:372-376.
- Nietschmann, B.  
 1989 "Traditional Sea Territories, Resources, and Rights in Torres Strait." In *A Sea of Small Boats*, 60-94. See Cordell 1989.

- Nietschmann, B., and T. Ely  
1987 "The New Pacific." *Cultural Survival Quarterly* 11 (2): 7-9.
- Nietschmann, B., and J. Nietschmann  
1981 "Good Dugong, Bad Dugong; Good Turtle, Bad Turtle." *Natural History* 90 (5): 54-63.
- Norgan, N., and J. Durnin  
1974 "The Energy and Nutrient Intake and the Energy Expenditure of 204 New Guinea Adults." *Philosophical Transactions of the Royal Society of London B* 268:309-348.
- Olewale, E., and D. Sebu  
1982 "Momoro (The Dugong) in the Western Province." In *Traditional Conservation in Papua New Guinea: Implications for Today*, 251-256. See Mourata, Pernetta, and Heaney 1982.
- Panoff, M.  
1969- "Land Tenure among the Maenge of New Britain." *Oceania* 40:177-194.  
1970
- Pernetta, J., and L. Hill  
1983 "A Review of Marine Resource Use in Coastal Papua." *Journal de la Société des Océanistes* 37:175-191.
- Polunin, N.  
1990 "Do Traditional Marine 'Reserves' Conserve? A View of the Indonesian and New Guinea Evidence." In *Traditional Marine Resource Management in the Pacific Basin: An Anthology*, 191-212. See Ruddle and Johannes 1990.
- Pomponio, A.  
1992 *Seagulls Don't Fly into the Bush: Cultural Identity and Development in Melanesia*. Belmont, California: Wadsworth.
- Pulea, M.  
1985 *Customary Law Relating to the Environment*. South Pacific Regional Environment Programme Topic Review, no. 212. Noumea: South Pacific Commission.
- Pulseford, R.  
1975 "Ceremonial Fishing for Tuna by the Motu of Pari." *Oceania* 66:107-113.
- Quinn, N., B. Kojis, and P. Warpeha, eds.  
n.d. *Subsistence Fishing Practices of Papua New Guinea*. Lae: Papua New Guinea University of Technology.
- Rodman, M.  
1989 *Deep Water: Development and Change in Pacific Village Fisheries*. Boulder, Colorado: Westview Press.
- Ruddle, K., and T. Akimichi, eds.  
1984 *Maritime Institutions in the Western Pacific*. Senri Ethnological Series, no. 17. Osaka: National Museum of Ethnology.

Ruddle, K., and R. Johannes, eds.

- 1990 *Traditional Marine Resource Management in the Pacific Basin: An Anthology*. Study No. 2. Jakarta: UNESCO/ROSTEA.

Schoeffel, P.

- 1985 "Women in the Fisheries of the South Pacific." In *Women in Development in the South Pacific*, ed. H. Hughes, 156-175. Canberra: Development Studies Centre, Australian National University.

South Pacific Commission

- 1988 *Proceedings of the Workshop on Pacific Inshore Fisheries Resources*. Noumea: South Pacific Commission.

Spring, S.

- 1982 "Subsistence Hunting of Marine Turtles in Papua New Guinea." In *Biology and Conservation of Sea Turtles*, ed. K. Bjørndal, 291-296. Washington, D.C.: Smithsonian Institution Press.

Swadling, P.

- 1977 "Depletion of Shellfish in the Traditional Gathering Beds of Pari." In *The Melanesian Environment*, ed. J. Winslow, 182-187. Canberra: Australian National University.

Tenakanai, C.

- 1986 "The Papua New Guinea Traditional Fisheries Study." In *Proceedings of the Torres Strait Fisheries Seminar, Port Moresby, 11-14 February, 1985*, 38-43. See Haines, Williams, and Coates 1986.

Williamson, H.

- 1989 "Conflicting Claims to the Gardens of the Sea: The Traditional Ownership of Resources in the Trobriand Islands of Papua New Guinea." *Melanesian Law Journal* 17:26-42.

Wright, A.

- 1990 "Marine Resource Use in Papua New Guinea: Can Traditional Concepts and Contemporary Development Be Integrated?" In *Traditional Marine Resource Management in the Pacific Basin: An Anthology*, 301-323. See Ruddle and Johannes 1990.