BOUNDARIES, BARRIERS & BRIDGES

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PHILOSOPHICAL FIELDWORK IN DERAWAN

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Introduction

The general problem we want to address in this report is: how to handle the growing tension between the evident heterogeneity of actors that have a stake in coastal zone management on the one hand and the apparent need for an integrated approach and a close cooperation among these various stakeholders on the other? Our solution to this problem involves the concept of 'boundary work', that is the different tactics and strategies people employ to achieve and maintain collaborative and integrative modes of problem solving. This concept needs further empirical and theoretical elaboration in order to help improve processes of communication and consensus building across the lines that separate communities.

Our report consists of three parts:

1) We will argue that, thanks to recent but persistent shifts in governance, there is indeed a growing heterogeneity of stakeholders in the management of common resources.

2) We will show that an integrated management approach is required in order to stop further degradation and destruction of the three interdependent coastal marine ecosystems of the Derawan Island chain: mangrove habitats, seagrass beds, and coral reefs.

3) We will introduce the notion of 'boundary work' as a conceptual tool to bridge the gap between the existing heterogeneity of actors involved in coastal zone management and the necessary cooperation among them.

1 Shifts in Governance:
The Growing Heterogeneity of Stakeholders and their Social Worlds

Due to political trends such as globalisation, individualization, deregulation and privatisation, the previous decades have shown an important shift in governance, i.e. in the way in which individuals and institutions, both private and public, manage their common affaires. In fact, this involves a two-dimensional shift. There is a *horizontal* shift from public to semi-public and private organizations, and from command and control to contracts and convenants between public and private actors. The growing interweaving of the state with the civil society and the market has led to the emergence of various kinds of '*multi-actor governance*'. At the same time there is a v*ertical* shift from the national level to supra-national levels and to sub-national or regional levels. These simultaneous processes of internationalisation and decentralisation have resulted in the emergence of all kinds of '*multi-level governance*'.
The double shift in governance has caused a significant increase in the amount of public and private players and has multiplied the decision-making layers. More than ever policy-makers are confronted with problems of coordination and communication. Especially where this political structure is compounded with problems of scarce resources. This plays itself out not only in advanced economies but in nations in transition like Indonesia as well.

	Civic Actors	**State Actors**	**Commercial Actors**
Supra-National Level	International Non-governmental Organizations (NGOs): World Wildlife Fund (WWF) The Nature Conservancy (TNC) Turtle Foundation	Intergovernmental Organizations (IGOs): Global: WTO, IMF, UNESCO, CITES Regional: AESEAN, APEC	Business INGOs: Int. Chamber of Commerce; World Council for Sustainable Development Transnational Companies (TNCs): Shell, BP, GM, IBM, Unilever
National Level	Indonesian Forum for the Environment (WAHLI) Indonesian Biodiversity Foundation (KEHATI)	Parliament and Government Departments of Fisheries, Forestry, Industry, Tourism etc. National Planning Agency (BAPPENAS)	Garuda Indonesia Telkom PT Petrokimia Gresik
Sub-National Level	Berau Lestari (BESTARI) KALBU	Province (Propinsi) Regency (Kabupaten) Sub-regency (Kecamatan) Municipality (Desa)	PT Berau Coal PT Kiani Kertas (pulp mill) Oil palm and rubber plantations Fish and shrimp industry Dive resorts Hotel operators Homestays

Table 1. Multi-actor and multi-level governance in Indonesia form the perspective of Derawan Island Chain

In this section we will first discuss the decentralization process that started after the downfall of Suharto (1.1). Next we will consider the complementary internationalisation process (1.2). After that, we will focus on one group of non-state actors, namely the NGOs active in the Derawan archipelago (1.3). Finally, we will present a stakeholder analysis with respect to coastal zone management in Derawan (1.4).

1.1. Decentralization

Crisis and Transition
The financial crisis, which hit Indonesia in mid-1997 and the ensuing struggle to rebuild the economy and transform the corrupt political system, resulted in major changes in the political, institutional and economic landscape. The financial crisis was caused by the so-called *triple whammy*: the interaction between the forest fires and drought of 1997/8 and the political and economic crises.
While Indonesia experienced its worst ever forest fires the financial crisis (commonly called *krismon* in Indonesia) brought severe economic, social and political impacts to the whole country. The Indonesian rupiah lost over half its value against the US dollar between July 1997 and February 1998. The economy contracted by 15% in 1998. Unemployment figures rose from 2.5 million in 1997 to 8.7 million in February 1998. The crisis brought a four-fold increase in poverty, with half the population now below the poverty line.
The economic crisis fuelled political pressures mounting against Suharto. The reform movement - opposition parliamentarians, students, activists and academics - was fast gathering momentum, demanding an end to *KKN* - corruption, collusion and nepotism - and calling for *reformasi total* in Indonesia. As student protesters filled the streets of Jakarta and other cities, public outrage grew at the military's brutal response. Food riots and violence, often directed at Chinese shopkeepers, became a daily occurrence in cities and even small towns. The pressure on Suharto mounted from within Indonesia and from abroad as creditor nations finally lost faith. On May 21st, 1998 Suharto was finally forced to resign the presidency.

The emergence of regional autonomy
President Habibie's interim regime passed new legislation in 1999 giving greater financial and decision-making powers to local government. This was, in part, a reaction to the demand for democracy and reform. At the same time, Indonesia's prolonged financial crisis was a powerful economic incentive to decentralisation - offloading the costs of the country's massive bureaucracy onto local administrations.
Law No 22 of 1999 on Regional Governance defines 'autonomous areas' as provinces (*Propinsis*), regencies (*Kabupatens*), sub-regencies (*Kecamatan*) and municipalities (*Desas*). The relationship between these is non-hierarchical - a break with the highly tiered system of the past. Regional heads at both province and regency level are to be selected by and accountable to local assemblies. Provincial governors (*Gubernors*), who are selected in consultation with the Jakarta, have a dual role because they continue to represent the center in the regions as well as fulfilling the role of autonomous area head. Regency heads (*Bupati*), however, no longer act as representatives of the center. The role of local parliaments has increased greatly, with the responsibility for drawing up regulations and budgets based on local needs.
Currently, the *Kabupatens* are the main beneficiaries of the transfer of power from center to regions. They also receive the greater share of the regional allocation of resource revenues. They were originally chosen as the main targets for the transfer of authority because it was thought that strengthening the larger provincial governments might foster regional identities

and encourage separatist tendencies. The non-hierarchical relationship - particularly between provinces and regencies - has led to provincial governors complaining that they have been left without authority and are not even informed any longer about what's going on in their areas. It is difficult to assess and evaluate the results of decentralization at this moment. On the one hand decentralization can help local communities to gain democratic control over decision-making and to manage their natural resources in a sustainable way and for their own benefit. On the other hand decentralization involves a budgetary shift at the expense of regional and local economies, reinforcing the pursuit of short-term profit instead of sustainable development. Furthermore, decentralization could actually strengthen the power of local elites who behave like petty despots and who merely duplicate at regional level the Suharto-era practices of resource plunder for maximum personal gain. It is feared that local military commanders will use regional autonomy to gain more control over coastal resources and collect more profit from their already well-established partnerships with commercial enterprises. There is evidence that 'rent seeking' and other illegal levies are increasing. Advocacy groups, political opposition, and NGOs are beginning to redress these problems; however, a lack of capacity within the juridical system limits their effectiveness (with respect to the regulation of environmentally damaging activities such as pollution and illegal activities such as land conversion).

East Kalimantan
Among the regions preparing for regional autonomy, East Kalimantan has been one of the most successful. The main motivating force has come from local NGOs and students who have prompted the development and debate on the question of what regional autonomy means and how it should be implemented. The emphasis was on securing revenues and using them for the benefit of local communities; sustainable resource management; strengthening local democracy; effective conflict resolution of disputes over resources; and developing a strong, accountable and transparent local legislative body.
While elsewhere in Borneo violent ethnic conflicts broke out, the period of transition in East Kalimantan was a relative calm and peaceful one. Elites belonging to various ethnic associations established a forum early in 1998 designed to reduce tensions, the *Forum Komunikasi Persaudaraan Masyarakat Kalimantan Timur* (FKPMKT). Another forum - the *Forum Komunikasi Antar-Etnik* (Forkas) - was set up during the Sampit outbreak in February 2001. According to Gerry van Klinken (*Indonesia's New Etnic Elites*), the main reason that the political transition in East Kalimantan was rather smooth its relative wealth. After all, East Kalimantan is one of the richest of the 27 provinces in Indonesia with regard to its natural resource base. Natural resources supply in the order of 90% of provincial revenues, with the main income provided by mining and timber (in the northern regencies) and by oil and gas deposits (in the south).

Berau Regency and Derawan Island Chain
East Kalimantan owes its wealth for an important part to *Kabupaten* Berau, one of the eight regencies of East Kalimantan. In statistical terms, the Berau regency is an extreme case. It is one of the largest, one of the least populated and one of the wealthiest of the 300 regencies of Indonesia. The economy of the Berau regency is characterized by a heavy dependence on the extraction of mineral and natural resources, mainly coal mining and logging. Economic growth is influenced by the implementation of large-scale investment projects, such as the

development of coal fields by P.T. Berau Coal, and the construction of the one billion US$ pulp plant of P.T. Kiani Kertas.[1]

Pulau Derawan, the object of this study, is one of the seven sub-regencies (*Kecamatan*) of Berau Regency. It includes Derawan Island, Sangalaki, Kakaban, Maratua, Panjang, Samama as well as several submerged reefs and small islets. The islands are located in the Sulawesi Sea, on the coastal shelf of East-Kalimantan, east of the Berau river delta, in a delta-front setting. Only two islands are inhabited: Derawan Island (3.5 sq km, one village, Desa Derawan) and Maratua Island (20 sq km, four villages).

1.2. Internationalization

So far, we only discussed the fairly recent emergence of regional autonomy. But Indonesia is not only subjected to a process of decentralization but also to one of internationalization. Intergovernmental organizations (IGOs) such as the United Nations (UN), the World Trade Organization (WTO) and the International Monetary Fund (IMF) play an increasingly influential role in the state affairs of advanced and transitional societies alike. Especially important for Indonesia are the Association of Southeast Asian Nations (ASEAN), established in 1967 to accelerate the economic growth, social progress and cultural development in the region and to promote regional peace and stability, and the Asia-Pacific Economic Cooperation (APEC), a grouping of ASEAN members and major East Asian and Pacific trading countries established in 1989.

An important example of an intergovernmental environmental agreement that is relevant for coastal zone management of the Derawan Island Chain is the World Heritage Convention of the UNESCO. This Convention was signed by Indonesia in 1989, and since 1991 6 sites put on the World Heritage list. It is planned to propose Kakaban Island and the adjacent areas to be World Heritage site.[2]

Indonesia is also signatory to the 1975 Convention on the International Trade of Endangered Species of Wild Flora and Fauna (CITES). Members of CITES agree to ban the commercial international trade in an agreed list of endangered species and to monitor trade in species that might become endangered. Species are listed in Appendixes to CITES on the basis of their degree of rarity and of the threat posed by trade.

The most endangered species are listed under Appendix I. This Appendix includes "all species threatened with extinction which are or may be affected by trade." International trade in these species is subject to particularly strict regulations and must only be authorized by the corresponding National CITES Management and Scientific Authorities. Trade permits for these species are only granted under exceptional circumstances. All six marine turtle species found in Indonesia are currently listed under Appendix I .

Other species at serious risk are included in Appendix II. This appendix includes "all species which although not necessarily currently threatened with extinction may become so unless trade is subject to strict regulation." Any international trade in Appendix II species requires export and import permits as well as re-export certificates, granted in accordance with conditions set forth in the Convention. Permits are granted by the National CITES Management and Scientific Authorities. Although stony corals were added to Appendix II of the CITES Agreement in 1985, this action simply allowed countries to follow the trade of the items. In that respect, there is agreement that corals are a species in need of monitoring;

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[1] The sectoral composition of the Berau economy is markedly different from the economies of EK and Indonesia as a whole. In Berau, forestry (including both harvesting and wood processing) accounts for about 30% of local Gross Domestic Product (GDP), against less than 20% for EK, and approximately 5% for Indonesia as a whole.

[2] See also the report on the one-day workshop on Management of Local Marine Protected Area of Kakaban Island, Tanjung Redeb, October 25, 2003.

however, there is no universal agreement on what type and how much regulation should be administered to the coral reefs. For now, regulation and trade control is left up to individual states.[3]

IGOs	WTO, IMF, APEC, AESEAN, UNESCO, CITES et cetera		
National Government	Department of Fisheries and Marine Affairs et cetera		
Provincial government	Propinsi	Gubernor	Kalimantan Timur
Regency	Kabupaten	Bupati	Berau
Sub-regency	Kecamatan	Camat	Pulau Derawan
Municipality	Desa	Kepala desa; kades	Desa Derawan

Table 2. Levels of governance in Indonesia

In sum, after the downfall of Suharto in 1998, a period of reform started in which authority was transferred from the central government to the province and further down to the regency and the sub-regency. While this opened up the possibility for local communities to manage their natural resources in sustainable ways and to their own benefit, the division of roles and responsibilities between different administrative levels has been thus complex that it threatens to hinder communication and collaboration between the various stakeholders, a situation that is further complicated by the complementary process of internationalization. For this we got some evidence from the people we interviewed in the first half of October 2003.
According to the director of Berau BESTARI in Tangun Redeb, Juhriansyah, relations with the government of the regency are good. The regency does some coordinating work, mainly through the organization of workshops. Relations between the regency and the province are problematic. Juhriansyh speaks of a 'gap' between these two levels of governance.
According to Dr. Ngurah Mahardika from WWF there are two levels on which a good cooperation is possible: the national level en the level of the regency. He considers the provincial level as powerless and irrelevant.
In response to the view of some that there is a gap between the provincial level and the level of the regency, Scott Alexander Stanley, program manager of TNC at Samarinda, explained the division of roles between province and regency: the province's task is regional planning; the regency's task is implementation. Lately, Scott told us, the province is reevaluating its role, from supervisor to advisor of the regency.

1.3. NGOs in Derawan

So far, we only looked at the complementary processes of internationalization and decentralization from the perspective of state actors and intergovernmental organizations (IGOs) that are established by states, formally ruled by states and instrumental to state interests. But these processes also play a role with respect to non-state actors. These include Non-Governmental Organizations (NGOs; civic pressure groups), Business NGOs (BINGOs; commercial pressure groups such as the International Chamber of Commerce and the World Council for Sustainable Development), Transnational Companies (TNCs such as Shell, BP, Ford, GM, Unilever, McDonalds and IBM), and epistemic communities (networks of experts on certain policy issues).[4] In this pilot study we were only able to map one important group of non-state actors, de NGOs.

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[3] There is also an Appendix III, including "all species which any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation. The cooperation of other Parties, is therefore, needed." Any international trade in Appendix III species requires an export permit, a certificate of origin, and sometimes a re-export certificate.
[4] Bas Arts: Non-State Actors in Global Governance. Three Faces of Power. Preprints aus der Max-Planck-Projektgruppe Recht der Gemeinschaftsgüter Aprl 2003

Today, the NGO community in Indonesia comprises tens of thousands of organizations, ranging from large well-established or well-funded foundations to small groups operating on a shoestring; from national networks to village co-operatives. Some are independent, radical campaigning groups; others are linked to political or religious parties; yet others are thinly disguised commercial ventures or may have been created purely to access government or donor funding.

Indonesia's NGO movement only began to grow with the national economic development of the late 1970s and 1980s. The anti-communist purges which accompanied the early days of Suharto's dictatorship wiped out or drove underground any independent organizations. Gradually, a new generation of well-educated, middle class individuals set up organizations to address the worst excesses of the New Order. Throughout the Suharto years, environmental activism was tolerated to a greater extent than other forms of political action. The international environmental movement had been boosted by the first UN 'Habitat' conference in Stockholm in 1972. Indonesia soon established an environment ministry. The minister, Emil Salim, had good intentions but a small budget and no field staff, so a symbiotic relationship developed between him and environmental groups in Indonesia. The NGOs could raise issues in public (as long as they were not too aggressive) and, in return, would receive tacit protection from government crackdowns. Their position was further strengthened by the 1982 Environment Act, which recognised civil society's role in protecting the environment. The most established environmental NGOs grew up during the 1980s under the protection of Emil Salim, then Indonesia's Environment Minister but later to become chair of the Indonesian Ecolabelling Group, LEI. The best known and perhaps the largest is WALHI, the Indonesian Friends of the Earth which is a forum representing 500 NGOs. During the past two decades, these NGOs have evolved and occupied new niches, for example the forest NGOs SKEPHI and LATIN. SKEPHI was originally a radical campaigning forest network; LATIN was a community forestry policy research group. Both were involved in setting up LEI and, until recently, were on FSC's board. More civil society groups sprang up around the end of the Suharto era – making the most of the increased political space for community action. These include the indigenous peoples' alliance AMAN, the CBNRM support groups like Kp-SHK and the student forestry group ARuPA.

In Derawan various international, national and local NGOs are active. We will briefly pass them in review.

International	The Nature Conservancy (TNC) World Wildlife Fund (WWF) Seacology Foundation Turtle Foundation
National	Indonesian Biodiversity Foundation (KEHATI)
Local	BESTARI KALBU

Tabel 3. NGOs active in the Derawan archipelago

The Nature Conservancy (TNC)
As Scott Alexander Stanley, program manager of TNC in Samarinda, explained to us, TNC is funded by multiple resources. The main sources are USAID, private donations and private foundations. Due to this kind of funding through multiple resources, TNC is not dependent of any single actor and as a result TNC can operate with much flexibility. TNC started in de USA some 50 years ago. In the beginning the strategy was to buy land in need of protection, under the motto: Saving The Last Great Places On Earth. Today, TNC owes around 10 million hectares of land. But this strategy was of not much help outside the USA. In Indonesia

you cannot just buy land and transform it into reserves. That is why a shift in strategy took place: now the focus is on the search for partners and the forming of partnerships.

TNC, with a staff of 52 people in Berau Regency, is interested in developing a comprehensive view on the Derawan region. TNC uses a 'site conservancy planning' method: first one is to find out which areas need protection, second an assessment is being made of stressors that are related to human activities, and third strategies will be developed with all the stakeholders involved to reduce this destructive impact. According to TNC, environmental, economic and ecological issues cannot and should not be handled separately.

TNC is much in favor of economic empowerment of local communities. TNC wants to organize village people, help them to improve their living standard (half of their yield is costs), increase prices. But in order to get a fair and good price for their fish they have to submit to codes of conduct.[5]

World Wildlife Fund (WWF)

Dr. Ngurah Mahardika told us that WWF is not itself concerned with implementation but looks for local partners like BESTARI instead. The overall strategy of WWF has shifted from a bioregional approach to a 'target-driven' approach, with an emphasis either on species or on marine. In Derawan there are two teams: the turtle-team, in which Dr. Ngurah is involved and that is funded by Dutch WWF, and the marine-team that is funded by German WWF. The marine-team was about to start and would focus on protected marine areas. The turtle-team was already active, mainly around Sangalaki. Its activities include:

1. Surveys of turtle habitat, followed by a local workshop to promote understanding of the stakeholders about the area that should be protected;
2. Facilitation/promotion of sustaining the sea turtle population;
3. Facilitation/promotion of patrolling activities, meant to prevent the capture of turtles for the market in Bali (maximum fine: 5 years in jail and/or? 100 million rupees).

Asked if WWF is also active in economic development, apart from environmental protection, Ngurah mentions that WWF also did some socio-economic surveys. WWF promotes eco-tourism and supports the development of standardized monitoring and safe guarding procedures for local people. WWF is also interested in the development of a 'revenue sharing system', a kind of small tourist tax to benefit local people. Ngurah was skeptical about the viability of alternatives for destructive fishing techniques like blasting and poisoning. The main obstacle to change is poverty.

With respect to Derawan Island, Ngurah tells us that WWF together with the government has launched a 'restarting' program on the island and trained local people to handle turtle eggs and turtle babies (from other islands) up to 4 month. For each turtle that successfully could be put to sea one could receive 10.000 rupees. However, this was not economically profitable enough for most people. In reply to our suggestion that it could be interesting from the point of view of tourism, and that this could be the reason why local people want to take over the hatchery from the resort, Ngurah claims that local people should indeed have a greater share in the revenues from turtle tourism.

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[5] Conservation scientist Suzette Stephens from the TNC office in Tanjung Redeb told us that the main objective of TNC is to help local stakeholders to manage their own natural resources as much as possible, combining economic improvement with ecological protection. Maybe in part due to this policy, local communities are growing less passive – for example, the Dayak, who traditionally are a very non-confrontational people, nowadays often successfully resist logging concessions. And more in general: local communities are more than before capable of resisting projects that only benefit people from outside

Indonesian Biodiversity Foundation (KEHATI)

The Indonesian Biodiversity Foundation (KEHATI) has been established in 1994 with the help of WWF. KEHATI wants to promote policies relevant to the conservation and sustainable use of biodiversity, to exchange information related to the sustainable use of biodiversity among concerned parties, and to foster and improve the ability of the community at large to conserve and utilize biodiversity in a fair, equitable and sustainable manner.[6]

Since 1998, KEHATI has developed a biodiversity conservation and sustainable utilization program in The Derawan Islands.[7] Main program goals are: to develop the capacity of human resources and local institutions in sustainable marine resources management, to support the development of integrated and participatory management of the Derawan Islands, and to develop conservation and sustainable utilization activities, including alternative livelihoods for local community.

Until the year of 2000, it was in the preparation phase (data collection, assessment, stakeholders workshop). Starting from January 2001, KEHATI has supported two local NGOs, BESTARI and KALBU, in developing the program with local communities in the Derawan Islands.

One of the main objectives is the introduction of Fish Aggregating Devices (FADs) in Maratua (see below). Another important objective is turtle conservation. The Berau District Government has asked three parties to help in the turtle conservation effort: KEHATI, WWF and the Turtle Foundation, a German NGO formed in 1999 by some dedicated filmmakers and divers, who had witnessed the harvesting of green sea turtle eggs on Pulau Sangalaki.[8]

In 2001, 20% of the nests laid in Sangalaki were excluded from exploitation. Turtle Foundation and KEHATI sent volunteers to do turtle monitoring and turtle eggs conservation. A Turtle Monitoring and Research Station was developed with the support from the German Embassy. The construction of this station was completed in April 2002. KEHATI is sending a technical assistance to be the station manager for the first year, to establish the operation of the station, database for turtle monitoring and dissemination of the data and information through display panels, newsletters, etc.

KEHATI has promoted the Kakaban conservation, through providing information on Kakaban to various stakeholders. The Department of Marine Affairs & Fisheries has adopted KEHATI's concept paper and scheme to establish Kakaban Island as the first District Level Conservation Area. Meetings at village and islands levels have been facilitated and the local community agreed that Kakaban needs to be conserved, with different management scheme from the existing schemes. The new scheme to be developed allows a limited access to Kakaban, active involvement from the local community, and under the responsibility of the District Government. Furthermore, it is planned to propose Kakaban Island and the adjacent areas to be World Heritage Site (with UNESCO).

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[6] Mohamad Soerjani, 'Inter-sectoral management of land, water, coastal and marine resources', *Jumal Universitas Paramadina* Vol.2 No.1, September 2002: 35-59.

[7] Christien Ismuranty, 'Building the co-management for the conservation and sustainable use of the Derawan Islands, East Kalimantan, Indonesia'. Kehati (Indonesia Biodiversity Foundation).

[8] Nesting occurs year round in this region, but research indicated that the number of nests laid on this tiny island of about 0.15 sq. km had dropped from around 200 nests per night in the late 1930's to 20–50 nests per night in 1993/94. In the face of this rapid decline of one of Indonesia's largest green turtle nesting populations, the Turtle Foundation's goal was to implement a conservation and monitoring program on the island. The aim is to work with the community to find alternative sources of income to replace that lost from the egg concession, estimated at 1 billion rupiah per year. (Source: Reisa & Kevin Latorra: Green Turtle Nesting at Pulau Sangalaki).

BESTARI & KALBU

Local NGOs active in Derawan are Yayasan Konservasi Alam Lingkungan dan Kebudayaan (KALBU) and Berau Lestari (BESTARI). Juhriansyah, Direktur Pelaksna of BESTARI, told us that although others financially support his organization, BESTARI is independent and follows its own course. Three financiers were mentioned by Juhriansyah: WWF, KEHATI, and the Seacology Foundation, a NGO with the sole purpose of preserving the environments and cultures of islands throughout the globe.[9] WWF financed comparative fishery studies, KEHATI financed public awareness campaigns and capacity building programs, both to promote community based conservation, and the Seacology Foundation financed studies of Fishing Aggregating Devices (FADs). By building FADs or 'Rumpon' fishermen can become less dependent on reef resources; they can help diminish illegal and destructive techniques such as dynamite and cyanide fishing.[10]

Activities planned by BESTARI for 2004 include: a workshop on eco-tourism, trainings in handicraft, in marketing of local products, and in coral rife monitoring.

1.4. Stakeholder Analysis

Stakeholder Analysis (SA) has been developed in response to the challenge of multiple interests and objectives, and particularly the search for efficient, equitable and environmentally sustainable development strategies. The term "stakeholders" is generally used to mean 'any group of people, organised or unorganised, who share a common interest or stake in a particular issue or system; the can be at any level or position in society, from global, national and regional concerns down to the level of household or intra-household, and be groups of any size or aggregation'.[11] Some general principles that are fundamental in stakeholder negotiations are *voice* (participation) and *procedural justice* (agreement on the fairness of rules for collaboration).[12]

SA is especially relevant for natural resource management because physical systems like watersheds, aquifers and coastal zones are 'boundary objects' (see below p.) that involve a vast variety of social, economic, and political groups and communities. Because natural resource management issues are characterised by competing interests, the system must be viewed "holistically", with an understanding of the gains and losses of all stakeholders using, managing or affected by the resource.[13]

A common tool in SA is the use of *matrices*. From their investigations Robin Grimble from the British Natural Resources Institute (NRI) and her associates learned that matrices can be useful analytical instruments for identifying and assessing the significance of conflicts and

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[9] Seacology searches for situations that not only protect the local environment, but also provide the islanders tangible benefits in return ('win-win' projects). Seacology's motto is, 'Saving the world ... one island village at a time.'

[10] FADs are made up of a large concrete weight attached to a length of chain and rope which stretches to the surface with a float at the end. Trailing material in the form of bamboo branches, long plastic strips or the like is attached to the rope. It is thought that this helps aggregate fish. Algae and small organisms settle on this material and this attracts small fish, which in turn attract bigger fish. Another theory is that FADs act as fixed reference points where fish can remain until a school of similar sized fish is assembled. In this way they swim as a large school and become more effective hunters and at the same time can avoid predation more efficiently. Fishermen can reduce their search time and save on fuel by going to just one location.

[11] Robin Grimble & Kate Wellard. 1997. 'Stakeholder Methodologies in Natural Resource Management: a Review of Principles, Contexts, Expierences and Opportunities. *Agricultural Systems*, Vol. 55, No. 2, p.176.

[12] Ramírez, R. 1999. Stakeholder analysis and conflict management. In: Buckles, D. (ed). *Conflict and collaboration in natural resource management*. IDRC/World Bank Institute, Ottawa and Washington D.C. 101-126.

[13] See also Robin Grimble et al. 1995. 'Trees and Trade-Offs: A Stakeholder Approach to Natural Resource Management. Gatekeeper Series No. 52 . International Institute for Environment and Development.

cooperation between different stakeholder groups. We will also use this tool, especially in order to classify potential and actual conflicts between state and non-state actors on various levels. Apart from government institutions and NGOs commercial organizations (such as dive resorts) and local communities (mainly constitutes by fisherman) have been included to arrive at a comprehensive picture of all stakeholders involved.[14] Two types of conflict can be distinguished: sectoral conflicts (yellow) and cross-sectoral conflicts (blue).

Government Institutions	1			
NGOs	5	2		
Local Communities	6	8	3	
Commercial Organizations	7	9	10	4
	Government Institutions	NGOs	Local Communities	Commercial Organizations

Tabel 4. Stakeholder Analysis of Derawan

1. Within and between Government Institutions
There are not only problems of coordination and communication between the various governance levels (IGOs, national government, propinsi, kabupaten, and kecamatan) but also between the various agencies on each of these levels, e.g. between departments of forestry and fisheries, or between the departments of fisheries and tourism).
The key conflict seems to be: *economic* and industrial vs. *environmental* and ecological concerns.

2. Within and between NGOs
According to Michael Haley and Anthony Clayton, the proliferation of NGOs has sometimes been counter-effective, resulting in duplication of effort, wastage of resources, and conscious or unconscious misrepresentation of results. Because they are dependent on public support NGOs at times tend to misrepresent complex problems and resort to inadequate strategies. 'People are generally more willing to donate to save pandas, rather than beetles, and to identify with one species, rather than an entire ecology. Unfortunately, these anthropomorphic tendencies do not necessarily reflect ecological priorities. This can oblige an environmental NGO to adopt fundamentally unhelpful positions'.[15] With respect to the management of

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[14] Wiryawan, B. & H.A. Susanto, 2003. Stakeholders Analysis for Marine Conservation Activities in Berau Regency, East Kalimentan. Report published by The Nature Conservancy. Samarinda, Indonesia.
[15] Michael Haley & Anthony Clayton. 2003. 'The Role of NGOs in Environmental Policy Failures in a Developing Country: The Mismanagement of Jamaica's Coral Reefs'. *Environmental Values*, 12: p.33.

Jamaica's coral reefs Haley and Clayton observed that the competition for money, especially given the decline in levels of external support, has on occasion led some environmental NGOs to denigrate the achievements of others, resulting in several unpleasant 'turf wars'.

In our interviews there is little indication of fierce competition among NGOs at Derawan. But there appear to be at least some tensions. For instance, TNC - often looked upon as 'microsoft of the NGOs' - is sometimes confronted with suspicion by local NGOs who fear that TNC will take over. Different strategies - e.g. WWFs focus on *species* versus TNCs focus on *ecosystems* - can also complicate communication and cooperation.

3. Within and between Local Communities

Natural resources tend to have multiple uses which are often not compatible and can create problems and conflicts between different occupational groups within local communities, e.g. between fishermen and tourist guides. However, these conflicts are not limited to conflicts between *on-site* stakeholders only but extend to conflicts between on-site and *off-site* stakeholders as well. Environmental problems are frequently associated with the prevalence of *externalities*, where the costs (and sometimes the benefits) are predominantly borne by others rather than the decision-maker in question.[16] Natural resource management issues are often complicated be conflicts between *upstream* and *downstream* communities, e.g. between loggers on the mainland and fishers on Derawan island (see section 2).

4. Within and between Commercial Organizations

There is currently only one type of commercial organization active on-site in Derawan, namely dive-resorts. There is little competition between these resorts and the few small-scale family-operated inns or homestays because both serve a different public. Potentially there is a tension between these resorts and of-site companies such as logging and mining companies that cause damage, however indirectly, to seagrass beds and coral reefs (see also section 2).

5. Between Government Institutions and NGOs

NGOs are mostly *single-issue* organizations while government institutions are always *multi-issue* organizations that have to balance a vast variety of different interests and concerns, e.g. economic and industrial concerns on the one hand and environmental and ecological concerns on the other (see 1). Moreover, Governments tend to concentrate on *short-term* gains – mainly for domestic and electoral reasons – and NGOs on *long-term* goals – as they aim at societal transformations in the long run.[17] However, because they are dependent on public support and donorations NGOs often fall short of these long-term goals and focus on acute crises and not on chronic crises (see also 2).

6. Between Government Institutions and Local Communities

Illegal fishing, logging, and egg harvesting

7. Between Government Institutions and Commercial Organizations

8. Between NGOs and Local Communities

The key conflict here is exploitation vs. conservation, or the *subtractive* vs. the *sustainable* use of natural resources. This conflict can become intensified if NGOs get entangled in competition for limited funds which, as we already noticed above, can lead to the duplication of effort and the wastage of resources, and also to the exaggeration of problems and the misrepresentation of results. Our interviews contain no indications for severe conflicts

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[16] See Robin Grimble et al. 1995, p.4.

[17] See: Bas Arts. 'International Policy Arrangements of State and Non-State Actors.

between local communities and NGOs in Derawan. In general, NGOs should avoid making promises and raising expectations without substantive results or significant follow-ups, or else much goodwill among local people might vanish in the long run.

9. Between NGOs and Commercial Organizations

10. *Between Local Communities and Commercial Organizations*
(Eco)tourism vs. destructive fishing, logging and turtle egg harvesting.[18]

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[18] This stakeholder analysis is far from complete. In section 3.2 ('Ethical fieldwork: value conflicts and boundary work') we will present a more differentiated picture of some stakeholder conflicts. But apart from conflicts, a complete stakeholder analysis should include compatibilities and cooperative actions between stakeholders.

2   The Need for Cooperation:
       Integrated Coastal Zone Management

In the previous section we discussed the fragmentation of responsibility and agency caused by the horizontal and vertical shifts in governance. As an immediate consequence of this shifts policy-makers have to deal increasingly with a wide array of groups, which do not necessarily share the same language or conceive of the world in a similar way. That is, with the two-dimensional shift in governance the spectre of the Tower of Babel looms large – there are too many voices and vocabularies, too many interests at stake. This weighs heavily on collaborative and integrative problem solving, which is required for any sustainable natural resource management. In this section we first will give a very rough sketch of Indonesia as an archipelagic country with a growing competition over coastal resources (2.1). Next we will characterize the environmental situation of the Derawan Island Chain as determined be three interlocking ecosystems: mangrove habitats, seagrass beds, and coral reefs (2.2.). This situation is severely threatened by overlogging, forest conversion, pollution, destructive fishing methods et cetera (2.3). To put a stop to the further deterioration of this situation and to the disturbance and potential destruction of the marine ecosystems in question an integrated approach to coastal zone management is an absolute requirement (2.4).

2.1. Indonesia as archipelagic country

Indonesia covers a vast area, with a total territory of 3.7 million sq km, almost 62% of which is sea. As an archipelagic country with 17.508 islands and more than 81.000 km of coastline, Indonesia is among the globe's richest areas in biodiversity as well as marine assets. Coastal resources are used for fishing, recreation, waste disposal, power generation, water supply, coal, building material, and mineral sands extraction, forestry, farming, and residential and industrial purposes.

Now coastal resources are under pressure, either as repositories for the effluent of industrial processes and domestic waste, or as prime sites for reclamation to create land for industry or agriculture or settlement. Moreover, during the course of last century, especially in Java, large cities have continued to expand at an accelerating pace, and this growth has become enough to disturb the coastal zone. On the other hand, Indonesia's population is increasing at an alarming rate. The Indonesian Central Bureau of Statistics has predicted a growth from 204 million in 1999 to 276 in 2020. Also, about 65% of the Indonesian people live in and around coastal areas, making the problem of managing the coastal zone in Indonesia more complex. The crucial problem is known as *lapar lahan* (hunger for land). Communities in the coastal zones and/or mangrove environment are densely populated and ethnically mixed. They are always looking for land and for food in the mangrove environment to support their life. Land tenure and resource allocation issues represent an important problem for land use, spatial planning, and forest management, and are a fundamental source of social conflict in many coastal areas in Indonesia.

Berau Regency[19]
As a result of population growth, coastal recourses are under severe pressure in Beau Regency as well. Berau Regency covers an area of 24.210 sq km and includes 21 river systems and 7 lakes. In 1996 this area contained a total of 90.064 registered citizens at an average population density of 3.72 people/sq km. Over the previous 10 years there is an annual growth rate of

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[19] Source: Carsten M. Hüttche, *Ecotourism Feasibility Report for Berau Regency.* The Nature Conservancy, December 2002.

5.5%. The table shows the population growth trends if either the 10-year average is maintained or if the more recent growth rate 1993-1996 of 11.1% is maintained. For the most part this high percentage is a consequence of the extensive transmigration program, particularly in the last 4 years.

Demographically the population of Kabupaten Berau is skewed towards the youngest (reproductively active) age classes, as might be expected of a population affected by transmigration. 46% of the total population is under the age of 20 years with the age classes representing actual or potential workers (10-65yrs) contributing 73% of the total. There are clear implications for the potential impact of the growth population on natural resources.

Projected Increase (%)	5.5	11.1
1996	90.064	90.064
2000	111.573	136.723
2005	151.254	230.386
2010	197.682	388.214
2015	258.363	654.163
2020	337.670	1.102.303
2025	441.322	1.857.445

Table 5. Demographic development in Berau Regency (Hüttche, 2002: 32/3)

2.2. Three Coastal Marine Ecosystems

To be able to assess the problems and perspectives, the threats and the opportunities of the Derawan Island chain we need to understand the ecological situation of this unique archipelago. This situation is determined by three types of coastal marine ecosystems that depend on one another for nutrients, organic matter, fish and marine animal migrations, and physical protection: mangrove habitats, seagrass beds, and coral reefs.[20]

Mangrove ecosystems
Mangrove ecosystems are made up mostly of mangrove tree along the shoreline both on land and in shallow water. Most mangroves in the Derawan island chain can be found on the islands of Semama, Maratua and Kakaban. The bottom sediment is usually muddy and is composed of algae and decomposing leaves and roots from the mangrove trees themselves called 'detritus'. This detritus mixture is the foundation of a complex food web hat expands to seagrass beds and coral reefs.

Mangroves grow in warmer parts of the world where the air temperature is at least 20 degrees and water temperature is at least 24 degrees. The must also be in relatively sheltered areas where seedlings can take root and sprout without being carried off by waves. They prefer muddy areas in shallow waters and will be more diverse in areas with a high tidal range.

An amazing array of marine animals is adapted to live in mangrove ecosystems. Archerfishes, mudskippers, barnacles and oysters, fiddler crabs and ghost crabs, snails and clams as well as numerous other species of fish, crustaceans and mollusks live in this habitat.

Mangroves take up oxygen through their roots under the soil, but the soil that mangroves grow in is very low in oxygen. Therefore, parts of the mangrove roots are above the water so they can take in oxygen from the air. Also, mangroves can draw up salty water from their

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[20] Source: A Natural History Guide to the Derawan Island Chain (East Kalimantan). By: Arnaz Mehta Erdmann, Budy Wiryawan and Irfan Yulianto. Published by The Nature Conservancy, East Kalimantan Program, September 2003.

roots and can filter out the salt. The salt is either expelled from the leaves or else stored in the leaves until the leaves die and drop off from the tree.

Mangroves provide a natural physical barrier against soil erosion and can also filter chemical and organic pollution from the water, which keeps the water on the coral reefs and sea grass beds clean. Mangroves act as a nursery and feeding round for juvenile fish and shrimp and provide habitat for crustaceans, mollusks, estuarine crocodiles and snakes. Seabirds and bats use mangroves for resting and breeding grounds and sometimes long-tailed macaques find food and shelter in mangrove trees. People also benefit from mangroves by having clean seawater, a source of seafood, building material, food, fuel and medicine.

Seagrass Ecosystems

The basic components of a sea grass ecosystem are sea grass beds and algae, which are found in calm, shallow areas between a coastal shoreline and a coral reef. Sea grass beds bind sandy sediments down to keep it from washing away over the reef crest, but also helps to transport sand to beaches. They are an important habitat for many sand-dwelling marine organisms such as sea snails, sea cucumbers, eels, gobies and shrimp. Sea grass beds also act as nurseries for juvenile reef fishes including economically important ones such as grouper and snappers. Sea grass beds are also vital feeding ground for dugongs and for green sea turtles. Finally, the detritus from sea grass is utilized as food for animals in the ocean that eat decomposing organic material.

Coral Reef Ecosystems

The physical structure of a reef is mainly made of limestone from hard coral skeletons; however, the remains of other organisms that contain calcium carbonate material also add to the reef structure (such as shells of clams and foams). Over time, broken bits of coral skeleton and calcium carbonate material are cemented together by encrusting red coralline algae and by magnesium calcite particles found in seawater.

Invertebrates (animals without backbones) such as corals, crabs, shrimp, sea stars, sea cucumbers, snails, clams, worms and sponges, as well as turtles and sea snakes, are just a few examples of the many animals that live on reefs. Algae are the main plant that lives on coral reefs.

Coral reefs provide a solid habitat to feed, spawn and take shelter in for marine organisms. For many people the main functions of a coral reef are to provide an important source of food, medicine and income. For the shoreline reefs are important to break up wave energy, which might otherwise destroy beaches and coastlines. And of course coral reefs also function as a beautiful place for people to see and enjoy.

Coral reef ecosystems are vulnerable systems. They require water temperatures between 20 – 28 degrees. If water becomes too warm, the corals will 'bleach' and can eventually die. Moreover, coral reefs require clear water because most reef-building corals contain symbiotic algae in their tissue, which requires strong sunlight to produce nutrients for survival. The symbiotic algae are important to coral reefs because corals depend greatly on the nutrients provided by these algae as a source of food. Furthermore, coral reefs thrive in water that is around 35 ppt (35 parts salt to 1.000 parts water). In areas where fresh water enters the sea, the coral reef growth will be limited. Finally, reef-building corals must anchor to a hard surface in order to grow. Areas of mud or sand are not suitable for most corals.

2.3. Threats and dangers

Deforestation
All three coastal marine ecosystems are threatened together with the enormous biodiversity they sustain. According to recent government data, 1.5 million hectares of mangroves have been wiped out during the past 18 years.[21] These valuable breeding grounds for fish and shrimp have been reduced from 4.2 million ha in 1982 to 2.7 million in 2000. The major causes of destruction include conversion to shrimp and fish ponds, pollution (especially from the oil industry), overlogging for timber and charcoal, and conversion for housing and industrial projects. In East Kalimantan none of the 150.000 ha of mangroves forests of the Mahakam Delta have protected status. Only 15.000 ha of the original area are left now, with most of the rest converted to shrimp farms. Several islands in the delta have now disappeared below sea level as a result. There are indications that The Berau Delta will follow this example.

Deforestation is speeding up nowadays, partly due to the decentralization process. As part of the move toward regional autonomy, Indonesia's district leaders can now grant IPPKs, permits for the exploitation of the forest, and an array of other permits to fell timber on land claimed by local communities. Indeed, they are under considerable pressure to generate new resources of revenue as allocations from the national government are being severely curtailed under the new autonomy laws.

Selective logging, as was prescribed by forestry concessions known by their Indonesian acronym HPH (Hak Pengusahaan Hutan), often leaves large areas of standing forest, which provides hunting grounds, food and other products. With IPPKs, the forests are completely razed.

It seems to be the investors, mostly logging companies seeking new resources of timber, who are driving the process. In return for the right to fell timber they offer a package deal. Sometimes they contribute toward the construction of a public building. They generally promise to hire villagers during the felling operation. In practice, only few people (mostly village leaders) benefit from this.

During Soeharto's New Order period, the central government used timber concessions as a form of political patronage. The indications are that a similar process is now taking place at the district level. Local officials, if they want to retain power, need the backing of the business elites, who are often involved in logging. In return for permits, officials secure the support they need to stay in office.

December 10th 2001, the Jakarta Post observed: "State Ministry of Environment statistics show a forest destruction rate of between 2 million and 2.4 million hectares a year. The rate was highest during the last two years. The environmental NGO WALHI says the deforestation rate is 3 million ha/yr; that only 40 million ha remain and that Kalimantan - which has the fastest rate of logging - could be logged out in 5 years."[22]

Coral reefs disappearing
Deforestation leads to the transportation of more and more strongly polluted sediments, threatening the see grass beds first and the coral reefs next. Coral "bleaching" caused by global warming has been identified as another major cause of coral destruction worldwide.

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[21] Source: 'Coastal resources in crisis', Down to Earth, no. 45, May 2000.
[22] With respect to deforestation in the Berau Regency, Marcel Steenis (Berau Forest Management Project, Januari 2001) provides the following figures. In 1997 forest covered 92.2% of the district, 1.940.000 ha. By year 2000, the area had decreased to 86.2% of the district, 1.800.000 ha. Overall decrease of 6%. Principal reason: conversion to industrial plantations (HTI). The average deforestation rate in Berau regency is currently 42.500 ha per year (= 116,5 ha per day)!

Scientists agree that the oceans are warming at a rate of between one and two degrees Celsius every 100 years. One scientist predicted recently that the world's reefs would be dead within 50 years, with only corals of non-tropical regions standing any chance of survival. Destructive fishing methods like blast fishing and poisoning are another major cause for the disappearing of coral reefs. In fields of dead coral rubble that have resulted from blast fishing, wave action constantly shifts and tumbles the loose coral rubble (sometimes as much as 50 cm in a day!) so that new reef-building corals do not have a chance to grow upon them. Fish bombing is a crime which carries a ten year prison sentence and a Rp 100 million fine under a 1985 law. It is nevertheless widespread throughout Indonesia. Large-scale operators who supply the explosives to fishermen often organize the fish bombing or poisoning. Since these fishermen are sometimes drawn from local communities, the operations become a cause of division and conflict between villagers as those using traditional methods try to defend their livelihoods.

Deforestation, global warming and destructive fishing practices together are fast destroying what remains of Indonesia's coral reefs. According to a report issued by the United Nations Environment Program (UNEP) more than 80% of Indonesia's 51,000 square km of coral reefs have been damaged. The report was compiled by scientists who carried out the most detailed assessment to date of coral reefs all over the world and is contained in UNEP's new World Atlas of Coral Reefs. According to the report, 82% of Indonesia's reefs are "at risk" from human activities, the most damaging of which is blast fishing.[23]

Although the occurrence of blast fishing in the Derawan island chain has decreased in the past few years due to increased enforcement and management of the island chain, blast fishing is still one of the biggest threats to coral reefs.

Decline of the green turtle
Coral bleaching, illegal fishing, sedimentation and pollution due to overlogging and mangrove conversion into shrimp and fish ponds, have a considerable impact on marine resources, especially fish, the main sources of food and income for the local community of Derawan Islands. Several studies and meetings indicate that the total catch of fish (such as napoleon wrasse and groupers) and lobster has been declining for the last ten years. The same holds true for turtles and turtle eggs.

Green turtles (*Chelonia mydas*) and scaled turtles (*Eretmochelys imbricata*) have a long history on Derawan. Thanks to their nutritious eggs sea turtles, particularly green turtles, are an important commodity. The local government has made the turtles an important source of locally generated income, with the government involving the business sector on a profit-sharing basis. The auctioning of the rights to collect turtle eggs has provided a significant income for the Berau District for the last 50 years. This concessionaire arrangement contributes an average of Rp 175 million per month to the local coffers.

In 1998, concessionaire holders were required to set aside 10 percent of their turtle eggs for hatching. The resulting hatchlings should be reared up to six months before being released into freedom to maintain the nesting population. However, with inadequate supervision and lack of knowledge of proper handling of the turtle eggs, the decree failed.

In 1999, the green turtle became protected in Indonesia. Green turtles have been placed on the international list of endangered species. The species is included in the Red Data Book of the International Union of Conservation of Nature, and in Appendix I of the Convention on International Trade of Endangered Species (CITES), of which Indonesia is a signatory. Species included in the Appendix are banned from being exploited and traded, except for

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[23] 'Coral reefs disappearing', Down to Earth, No. 51, Nov. 2001.

scientific and breeding purposes. Thus, turtle exploitation in Berau has been put under the national and international spotlight.

With increasing pressure for the conservation of turtles and their habitat, the local administration decided to halt the exploitation of turtles as of July 2002. "Berau is committed to giving up the annual revenues of Rp 1 billion from turtle eggs and stop exploiting the reptiles," Berau Regent H. Masdjuni told participants of a workshop on sea turtle-based tourism in Derawan in March 2002.[24]
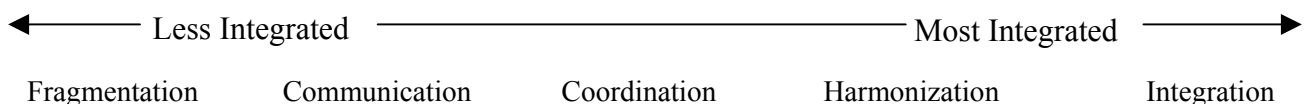
But the chief of Berau's Regional Environmental Management Board (*Bapelda*), Suparno Kasim, openly doubted whether it would be possible to stop the exploitation of the turtles completely. He argued that the demand for turtle meat came from other provinces, such as Bali, and turtle eggs had long been a traditional delicacy and would continue to be so. Besides, he said, the trade in turtle eggs and meat had spread as far as Sabah, Malaysia. Turtle meat and shells are valuable commodities in certain areas, especially Bali, where turtle meat is needed for some religious rituals. Souvenirs made of turtle shells are also in high demand in Bali. This keeps demand for turtles from the Derawan Islands high.

2.4. Integrated Coastal Zone Management (ICZM)

These threats and dangers to the interconnected marine ecosystems of Derawan Island Cain can only be averted through an integrated approach such as the so-called Integrated Coastal Zone Management (ICZM).[25] ICZM can be defined as a continuous and dynamic process by which decisions are made for the sustainable use, development, and protection of coastal and marine areas and resources. Primarily, the process is designed to overcome the fragmentation inherent in both the sectoral management approach and the splits in jurisdiction among levels of government at the land-water interface. Several dimensions of integration need to be addressed as a part of an ICZM process:

1. Integration among sectors: among coastal/marine sectors (e.g. oil and gas development, fisheries, coastal tourism, marine mammal protection, port development) and between coastal/marine sectors and other land based sector such as forestry and agriculture.
2. Integration between the landward and the seaward side of the coastal zone.
3. Integration among levels of governance (supra-national national, sub-national, local).
4. Integration among disciplines (such as natural sciences, social sciences, and engineering)

Biliana Cicin-Sain[26] drew up a continuum of integration in coastal management:

◄──────── Less Integrated ─────────────────────── Most Integrated ────────►

Fragmentation   Communication   Coordination   Harmonization   Integration

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[24] 'Berau struggling to save green turtles', The Jakarta Post, April 23, 2002.

[25] Handoko Adi Susanto, Harvey Demaine, and Ole Pedersen. 'Sustainability of an integrated coastal management model in South Lampung District'.School of Environment, Resources and Development, Asian Institute of Technology. See also: Sukristijono Sukardjo, 'Integrated Coastal Zone Management (ICZM) in Indonesia: A View from a Mangrove Ecologist', *Southeast Asian Studies*, Vol. 40, No. 2, September 2002.

[26] Cicin-Sain, B. 1993. Sustainable Development and Integrated Coastal Management. *Ocean & Coastal Management* 21:11-43.

Going from the left to the right on the continuum, from a situation of less integration to one of more integration, one can distinguish the following situations:

Fragmentation	Presence of independent units with little communication between them
Communication	There is a forum for periodic communication among the independent units
Coordination	Independent units take some actions to synchronize their work
Harmonization	Independent units take some actions to synchronize their work, guided by a set of explicit policy goals and directions, generally set at a higher level
Integration	There are more formal mechanisms to synchronize the work of various units which lose at least parts of their independences as they must respond to explicit policy goals and directions (this often involves administrative reorganization)

Table 6. Integration characteristics of coastal management (Cicin-Sain, 1993: 26)

From our interviews with NGOs we gathered that integration is nearly absent in Derawan. Budy Wiryawan from NTC field office at Derawan, who located the situation somewhere in the middle of the continuum, is an exception. According to Ngurah Mahardika from WWF the situation should be characterized as one of fragmentation. There are many problems of coordination in the area. Most activities are undertaken in isolation, which makes it almost impossible to assess if there is any progress achieved at all. The notion of ICZM plays a role but is contested and is interpreted differently by the various parties involved. What is lacking most is an institutional framework for an integrated approach to coastal zone management. An organization that perhaps in the future could act as such a framework, Ngurah suggested, is the Natural and Marine Resources Management Committee that was installed in April 2003. Scott Alexander Stanley from TNC head office in Samarinda also complaints about the fragmented approach in current coastal zone management. TNC is interested in developing a comprehensive view on the Derawan region, and accordingly is in favor of an integrated approach to the management of the mangrove system, the sea grass system and the coral reefs, treating them as an interacting whole. In 2001 TNC organized a workshop in Sangalaki with all stakeholders to promote such an integrated approach. Scott hopes that it will be possible to arrive at a joint work plan with the other NGOs. There are some obstacles on this road, for instance the aforementioned difference between the species oriented approach of WWF and the ecosystem oriented of TNC. These differences came to the fore during discussions about the constitution of the Natural and Marine Resources Management Committee. At this moment the committee that was installed in April 2003 has not enough power, in part due to the fact that the chief of the regency is reluctant to add another bureaucratic institution to the already existing ones. But Scott is optimistic about the opportunities for the empowerment of this committee, and he is also confident that – at least in the long run - all NGOs will set aside their differences and will cooperate.

3   Boundary Work:
The coexistence of heterogeneity and cooperation

The tension between the heterogeneity of stakeholders and levels of organization on the one hand and the necessity of cooperation and an integrated approach to coastal zone management on the other can only successfully be resolved through 'boundary work'. In this section we explore the importance and significance of this notion for integrative and collaborative problem solving in coastal zone management issues. First we will sketch the theoretical framework that was developed around this notion in Science and Technology Studies (3.1). Next we will go in to the ethical fieldwork we conducted in October last year in Derawan and briefly demonstrate the suitability of the theoretical framework with 3 case studies (3.2).

3.1. Theoretical framework: boundary objects and organizations

The term 'boundary work' was launched in 1981 by Steven Woolgar, who two years before together with Bruno Latour published the epoch-making book *Laboratory Life: The Construction of Scientific Facts,* the Bible so to speak of the constructivist approach within Science and Technology Studies (STS). Thomas Gieryn further developed this notion. He studied how actors carve out a domain of cognitive authority for their discipline. He stressed the negotiated nature of what is considered science and what not. According to Gieryn the boundaries of science are rather fluid than fixed – they are 'ambiguous, flexible, historically changing, contextually variable, internally inconsistent, and sometimes disputed'.[27] Gieryn's focus is on processes of differentiation, demarcation and distancing science from pseudo-science, ideology, or beliefs.

Susan Leigh Star has shifted the focus from competition over cognitive claims and cultural capital to cooperation across the lines that separate communities. The two approaches are complementary. Together, they illuminate what separates or integrates various groups on different geographic scales and organizational levels, and what complicates or facilitates communication and consensus building between them.

Star's problem is similar to the problem we are faced with in Derawan. On the basis of a case study of the historical development of the Museum of Vertebrate Zoology at the University of California, Star shows how heterogeneity and cooperation can coexist. Scientific work is heterogeneous, requiring many different actors and viewpoints, but at the same time it also requires cooperation – 'to create common understandings, to ensure reliability across domains and to gather information which retains its integrity across time, space and local contingencies'.[28]

Star's uses an 'ecological' approach framed in terms of understanding science as collective action from the viewpoints of all stakeholders and social worlds involved, and thereby avoids the pre-eminence of any one actor. This approach focuses on the multiple translation efforts through which actors who are simultaneously attempting to interest others in their concerns and objectives construct scientific knowledge.

Boundary objects
The tension between the heterogeneous nature of scientific work and its requirement for cooperation cannot be managed via a simple pluralism or a laissez-faire solution. Star introduces the notion of 'boundary objects' to explain how people in practice handle both

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[27] Thomas F. Gieryn. 1983. 'Boundary-Work and the Demarcation of Science from Non-science'. *American Sociological Review*, 48 (6), 781-795 (here: p.792).

[28] Susan Leigh Star & James R. Griesemer. 1989. 'Institutional Ecology, "Translations" and Boundary Objects'. *Social Studies of Science*, 19, 387-420 (here: p. 387).

diversity and cooperation. 'This is an analytic concept of those scientific objects which both inhabit several intersecting social worlds … *and* satisfy the informational requirements of each of them. Boundary objects are objects that are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds' (ibid., p. 393). One of the most important features of the boundary object is that one group does not create or set the meaning of the object for other groups nor does one group regulate access to the object by other groups. 'Boundary objects act as anchors or bridges, however temporary' (ibid., p.414). Of course the creation of boundary objects is only one means to settle conflicts; other means include imperialist imposition of representation, coercion, silencing and fragmentation.

In their case study of the Museum of Vertebrate Zoology Star and Griesemer distinguish four types of boundary objects:

1. *Repositories*. These are piles of objects which are indexed in a standardized fashion like that found in a library or museum.
2. *Ideal types*. These are descriptions (such as the species-concept) which are adaptable to local sites precisely because they are fairly vague.
3. *Coincident boundaries*. These are common objects which have the same boundaries but different internal contents. Star and Griesemer use the example of the state of California as boundary object — the maps that represent it are created for different purposes but share a common set of boundaries.
4. *Standardized forms*. These are boundary objects devised as methods of common communication across dispersed work groups, for example methods of collecting, preserving, labelling and taking field notes.

It is clear from this list, which is not meant as an exhaustive list by Star and Griesemer, that boundary objects are quite divers. They not only include objects in the strict sense but also concepts, not only products but also processes and even people.

Metaphors as boundary objects
An important type of boundary objects is metaphor. Metaphors are mechanisms for understanding something in terms of something else. The conceptual function of metaphors is generally to understand complex, abstract or unstructured domains with the help of concepts from more familiar, concrete and well-known domains. But metaphors are not only important cognitive tools in making sense of the world but also in communicating about the world with others. Moreover, they act like boundary objects: they are ambiguous and also flexible enough to allow for several uses and interpretations, both over time and across various topics, yet at the same time they are robust enough to maintain a basic set of conventional associations. Metaphors offer resonance between different social and temporal domains, they may serve as diplomatic devices that facilitate communication between different discourses and may function as tools of translation across the boundaries that separate different groups or communities.[29]

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[29] Iina Hellsten. *The Politics of Metaphor*. Tampere University Press. Tampere, 2002.

A focus on metaphors as important boundary objects in an inquiry of coastal zone management is clearly justified once it is realised that metaphors play a crucial role in intractable social and moral controversies. According to pragmatist Donald Schön the difficulties in handling these controversies have more to do with problem setting than with problem solving, 'more to do with ways in which we frame the purposes to be achieved than with the selection of optimal means for achieving them'.[30]

According to Schön, problem settings are mediated by the stories in which people tell what is wrong and what needs fixing in a troublesome situation. When we examine these problem-setting stories, it becomes apparent that the framing of problems often depends upon metaphors underlying the stories which generate problem setting and set the directions of problem solving. Metaphors enable us – generally automatically and unconsciously - to make a 'normative leap' from data to recommendations, from fact to values, from 'is' to 'ought'. Schön gives the example of a slum that could be framed as a disease (that must be cured) or as a natural community (which must be protected or restored). Once we can see the problematic situation in terms of a normative dualism such as health/disease or nature/artifice, we shall know in what direction to move. It is the metaphor articulating the frame that carries over the logic from 'is' to 'ought'.

As a pragmatist, Schön is interested in the creative and constructive resolution of policy controversies, generated by different and conflicting metaphors. Such controversies seem intractable; they are often not resolvable by recourse to facts and unlikely to be settled by compromise. They require what Schön calls '*frame restructuring*'. Hereby 'we respond to frame conflict by constructing a new problem-setting story, one in which we attempt to integrate conflicting frames by including features and relations drawn from earlier stories'.[31]

A necessary condition for frame restructuring, i.e. the recasting and reconnecting of things and relations in the perceptual and social field, is *frame reflection*. This requires what Schön and Rein have called 'double vision': the ability to act from a frame while cultivating awareness of alternative frames.[32]

Boundary organizations

To complete our theoretical framework we have to make use of another concept besides boundary objects, namely boundary organizations. This concept was introduced by David H. Guston with respect to organizations operating at the interface between science and policy. The success of these organizations depends on the degree to which they are able to meet the following criteria. First, they have to provide the opportunity and sometimes the incentives for the creation and use of boundary objects. Second, they have to involve the participation of actors from both sides of the boundary, as well as professionals who serve a mediating role. Third, they have to exist at the frontier of the two relatively different social worlds of politics and science, but they have distinct lines of accountability to each.[33]

Apart from most NGOs the aforementioned Natural and Marine Resources Management Committee, that was installed in April 2003, can be considered as an emerging boundary organization operating at the interface between multiple social worlds and levels of organization, facilitating the flow of resources (concepts, skills, materials, techniques, instruments).

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[30] Schön, D.A. (1979). 'Generative Metaphor: A Perspective on Problem-Setting in Social Policy'. In: A. Ortony (ed.) *Metaphor and Thought*. Cambridge. Cambridge University Press: 254-284 (here: p.255).
[31] Ibidem., p.270.
[32] Schön, D. & M. Rein. (1994). *Frame Reflection*. Basic Books: p.207.
[33] David H. Guston. (2001). 'Boundary Organizations in Environmental Policy and Science: An Introduction'. *Science, Technology, & Human Values* 26(4), 399-408 (here: p.400/1).

3.2. Ethical fieldwork: value conflicts and boundary work

Ethics is usually associated with desk research (reading and writing papers and books) or with moral deliberation (in the context of ethical committees). On-site ethical research or ethical fieldwork is different. In this section we will explain what ethical fieldwork amounts to and how we used it in the context of our East-Kalimantan Project.

We start from a series of presumptions. First of all, we believe that morality is not a private matter. Rather, it is a collective or social phenomenon, something that evolves in the context of human interactions. Secondly, values tend to become visible as "values in conflict". As long as values are taken for granted, and as long as we are surrounded by kindred spirits, by people of one mind, our values will be hardly noticeable at all. It is in the confrontation with "moral strangers" that we will become aware of the values we have. Thirdly, values and value judgments are not "self-supporting". They are part of a broader framework. They are influenced, for example, by the stakes and interests we have, by the types of knowledge we rely on as well as by the possibilities we have at our disposal to influence our environment effectively. Therefore, in order to study value conflicts, we have to ask ourselves how these "variables" are distributed over various stakeholders:

	Values	Interests	Knowledge	Power
Local communities	Commodity value	Short-term versus long-term economical values	Experiential knowledge	Impact; alternatives?
External users	Amenity value	Conservation and development	Various sources	Alternatives (eco-tourism)
GO	Commodity value	Authority maintenance (regulation, surveillance)	Assessments	Lack of facilities and human resources
NGO	Intrinsic value of eco-systems and species	Conservation	Research	Access to a relatively broad audience
Research Communities	Intrinsic value of reliable knowledge	Permits, facilities	Research data	Scientific output

Table 7: General scheme

Finally, various meanings of the world "value" should be distinguished, such as: commodity value (economic value), amenity value (esthetical value) and intrinsic value (ethical value). The most obvious and profane meaning of value is *commodity value*. The local community living on Derawan Island, for example, depends for its livelihood on fishery. Their *interests*, however, are not unequivocal. Notably, we can distinguish between short-term interests (daily income) and long-term interests (sustainable fishery, maintenance of fish stock on behalf of future generations). Basically, the local community will rely on *experiential knowledge* to determine what is in their interest, although other forms of knowledge are available as well, such as the knowledge disseminated by workshops on sustainable and non-sustainable fishery organised by NGOs. Natural resources will basically have commodity value, although worldview and religious convictions may foster sensitivity towards intrinsic value as well. Through the techniques used for fishery (sustainable versus non-sustainable) the local community has a significant impact on its environment (and impact is a form of *power*). On the other hand, it is important to determine the extent to which alternative forms of economic activity (sustainable fishery, tourism, eco-tourism) are realistic options. Being deprived of

options for change is an important form of powerlessness. Both other stakeholders are having an impact on the environment as well. External users (eco-tourists for example) will stimulate the development of new (and perhaps more sustainable) forms of economic activity. For eco-tourists, *amenity value* is important. When it comes to knowledge, eco-tourists will derive their knowledge from various sources (science, media, experiential knowledge). Our ethical fieldwork (notably site visits and interviews with local respondents) allowed us to elaborate this scheme. Moreover, on the basis of this scheme, a number of value conflicts could be identified.

Case study A. "Blast fishing"
An acute value conflict is the issue of non-sustainable fishery. Our interviews indicated that bombs and chemicals are still used on a relatively large scale as a means to increase catch. This issue was addressed not only by government officials and NGO staff members, but also by several respondents within the local community.

Interests	Short-term interests (daily income) are allowed to prevail over long-term interests (fish stock maintenance).
Knowledge	Respondents indicated that local fishermen are aware of the environmental damage caused by the use of illegal techniques. They can see the damage done to coral reefs by blast fishing, for example, when they dive to collect the fish. Moreover, several respondents indicated (on the basis of experiential knowledge) that fish stock have declined during recent years. NGOs active in the region organise workshops the stimulate awareness of the long-term detrimental consequences of blast fishing.
Power	Several respondents indicated that, in principle, there is a willingness the change but many local fishermen are of the opinion that the loss of income should be compensated by GO's and that, as a rule, the absence of alternatives is a major problem. Eco-tourism as a new and more sustainable form of economic activity involves substantial know-how and investments (notably in infrastructure and facilities). Although eco-tourism was generally seen as a viable alternative for the region as such, the local communities hardly participated in or profited from this development. Another alternative (besides eco-tourism) mentioned by respondents was tourism as such. Some respondents referred to Bali as a paradigm that the Berau area should try to copy. Again, infrastructure posed a major obstacle. The area is difficult to reach. Finally, sustainable fishery is an alternative (as indicated elsewhere), but this also presupposes knowledge and skill, besides facilities. Finally, the interviews gave us the impression that local authorities (GO's) lack the facilities and means (man power, equipment) to enforce sustainable practices (or to ban illegal ones) effectively.
Value	Local communities appreciate natural resources primarily in terms of commodity value. As was indicated above, there is a willingness to switch to more sustainable forms of fishery, but not the expense of short-term interests. Several efforts to further long-term interests (fish stock maintenance) can be mentioned, such as a recent initiative to provide the local community with larger boats in order to increase their radius of action. External users will tend to focus on amenity value. Finally, for NGOs active in this region, intrinsic value of nature is an issue. Contrary to what we expected (given the importance of stewardship in the Islamic world-view), our interviews did not indicate that (Islamic) religious convictions had an impact on sensitivity

towards intrinsic value of nature.		

Table 8: Blast fishing

	Values	Interests	Knowledge	Power
Local communities	Commodity value	Short-term vs. long-term interests	Experiential knowledge, workshops	Alternatives?
External users	Amenity value	Conservation of natural resources	Various sources	New sustainable economic activities
NGO	Intrinsic value	Awareness	Research, scientific information	Educational activities (workshops), alternatives

Table 9: Blast fishing: key issues

Case study B: "Sea Turtles"

The "blast fishing"-case focussed on value conflicts between local communities (fishermen), external users (eco-tourists) and NGOs (international organizations). Another interesting value conflict involved a NGO (the WWF) on the one hand and scientists (the research community) on the other. According to the organization's website, the WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by: conserving the world's biological diversity; ensuring that the use of renewable natural resources is sustainable; promoting the reduction of pollution and wasteful consumption. Its work covers many different areas, from policy work to campaigning, on-the-ground action to education and capacity building. When it comes to *strategy*, the WWF tries to incite public attention by focussing on endangered "flagship species", such as the green sea turtle. Its basic message is that the green sea turtle is an endangered species and that the population of greens ea turtles living in the Derawan area is under pressure.

The WWF's objective (increasing the turtle stock) tends to coincide with the values and interests of eco-tourists. They likewise tend to appreciate abundant presence of green sea turtles in the area. The sea turtle is, so to speak, a symbol that gives the area a "face". Actually, the population of sea turtles is boosted artificially by means of a sea turtle hatchery that was operated on the premises of the Derawan Dive Resort.

The sea turtle as a "flagship species" (WWF website)

Sea turtle hatchery, Derawar Island

This desire to safeguard, or even boost, the incidence of green sea turtle as an endangered species in the area, either indirectly (through sustainable fishery) or directly (through hatching) actually conflicted with the views of some of the scientists (sea-grass experts) on our team. According to these sea-grass experts, there were far too many sea turtles in the area and overpopulation caused tremendous damage to the sea-grass beds. Although the WWF's claim that the sea turtle is an endangered species is apparently supported by research and ecological data as well, the credibility and validity of this information was contested by the research community of sea-grass experts. In terms of values, these experts pretended to be neutral, as a rule. Typically, an ecologist will distinguish between "environmental science" (value-neutral) and "environmentalism" (value-based). In our view, this conflict between WWF as an NGO and sea-grass experts amounts to a dispute over the relative value of two environmental targets: saving or restoring the green sea turtle population (endangered species approach) and saving or restoring sea-grass beds (endangered eco-systems approach). We are not qualified to assess the validity of the arguments involved, but the case study is important to the extent that it highlights the interconnectedness of epistemology and ethics, of knowledge and values.

	Values	Interests	Knowledge	Power
External users	Amenity value	Abundant presence of sea turtles	Various sources	Dive resort: sea turtle hatchery
NGO	Intrinsic value of flagship species	Abundant presence of sea turtles ("flagship species")	Factual data (credibility disputed)	Campaigns
Research Community	Intrinsic value of eco-systems	Sea-grass beds (ecosystem health)	Scientific evidence	Scientific publications

Table 10: the green sea turtle

Case study C. "Conflicting strategies"
So far, we referred to value conflicts *between* stakeholders. Our third case study deals with a value conflicts between two stakeholders who belong to the same category. In the Berau area, two international NGOs are very active and visible: WWF and TNC. In terms of objectives, they seem to focus on similar goals. The mission of the WWF was already described above. The basic objective of TNC is "to save the last great places on earth". The mission of TNC, as formulated on its website, is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. In order to achieve this mission, TNC has developed a strategic, science-based planning

process, called *Conservation by Design*, which helps us identify the highest-priority places—landscapes and seascapes that, if conserved, promise to ensure biodiversity over the long term.

If we compare this mission statement with the mission statement of WWF, at least two terms are important, namely "science-based" and "landscape". These terms already indicate that, although the long-term objectives of both NGOs may be more or less similar, their strategies are not. As we have seen in the previous case, the strategy of WWF is to focus on target species or flagship species. TNC, on the other hand, tends to focus on landscapes and seascapes, on places, on biosystems. WWF stresses the endangered status of a species that gives a particular area (such as the Berau delta) an identity, a face so to speak. It addresses the general international public with a relatively simple but effective message: save the sea turtle. TNC on the others hand uses a more science-based approach. Its strategy is more likely to reflect (or to be congenial with) a biologist's approach (arguing in terms of ecosystems), whereas the WWF strategy is more congenial with a lay person's perspective (focussing on conspicuous species). TNC not only invests in nature conservation, but also contributes significantly to scientific research, although some scientists contested the reliability of the methods uses by TNC ("quick scans" in order to assess the biodiversity of complete ecosystems rather than of particular groups of species). It is not our intention to pronounce a verdict on the value of these various strategies. We merely wish to point out the intimate ways in which *interests* (international visibility and funding), *values* (conservation of "species" versus "ecosystems"), *knowledge* (research-based or public-oriented) and *power* (regional and/or international impact) are interwoven.

	Values	Interests	Knowledge	Power
WWF	Intrinsic value of flagship species	Funding	More or less "popular" understanding of biodiversity	Campaigns; Local and international impact
TNC	Intrinsic value of ecosystems	Funding	Science-based understanding of biodiversity	Campaigns; Local and international impact

Table 11: NGO strategies

Boundary work, boundary objects, boundary organizations
How can the concept of *boundary work* provide us with a tool for dealing with such value conflicts? Our starting point is the demarcation between reliable (scientific) knowledge and unreliable information. Scientists will try to carve out cognitive authority for their discipline. When it comes to making policy decisions, expert knowledge should prevail over competing knowledge resources that are seen as biased or ideological. The concept of boundary work, however, implies that this demarcation is likely to become more fluid. All stakeholders involved will rely on certain types of knowledge. When it comes to assessing the relative value of these types of knowledge, their various strengths and weaknesses must be pointed

out. Scientific knowledge (research data), for example, tends to be very reliable, but its significance for current practices, or for opening up prospects for change, is often far from clear. The factual information provided by NGOs, on the other hand, tends to be readily applicable to concrete problem situations, but the epistemological status of the information involved may be contested by scientific communities. The concept of boundary work involves the idea that a comprehensive view should be open to *both* kinds of knowledge claims, coming from different sources. It goes without saying that the credibility of these claims has to be assessed in a critical manner, but each type of knowledge has its own criteria for assessment. An academic assessment of biodiversity that restricts itself to limited groups of species, for example, and a quick scan used to determine the biodiversity of a complete eco-system, should be seen as complementary sources of information rather than as competitive. The green sea turtle is a beautiful example of a *boundary object*. From the point of view of WWF, the sea green turtle is a flagship species that gives the area a face. It is a highly visible and conspicuous "eye-catcher" that allows WWF to draw public attention to the ecological problems of the area. From the point of view of ecology (represented by sea-grass experts in this case study), the green sea turtle is rather an element within a broader eco-system. Whereas the view of WWF is closer to the lay-person's perspective, the view of TNC seems more congenial with that of the research community. The concept "boundary object" implies that we should not try to force this object into one particular identity. Rather, the views presented above can be seen as complementary in the sense that they highlight various dimensions of the problem case that are relevant in themselves. *Being* a boundary object, the green sea turtle allows us to mutually expose these contrasting views to one another. Rather than accepting fixed demarcations between "scientific views" and "popular" or "ideological" views, the sea turtle (as a boundary object) makes it possible for the scientific approach to be challenged by the target-species-approach and vice versa. The view of WWF is not purely "ideological", on the contrary, it is based on factual data, but interpreted in a certain light. WWF is always looking for a flagship-species as a kind of leverage that opens up the area, thus allowing it to become an object of public concern. Scientists may try to identify target species as well, as indicators that allow us to determine eco-system health. The problem will then be to determine the *meaning* of scientific data: what do we "know" (in a broader and more fundamental sense) when we have determined that the incidence of certain species of snail or fish has increased or declined? Thus, the boundary species may act as a bridge to open up a dialogue between various stakeholders, such as NGOs and research communities, over the objectives and relative value of research activities in the Berau area.

Finally, WWF can be seen as a perfect example of what we have referred to as a *boundary organization*. On the one hand it is an international organization that has the objective of acquiring and disseminating knowledge concerning the condition of endangered species and their habitats. As such, WWF contributes to our stock of knowledge. On the other hand, WWF is an ideological organization that allows its values (survival of flagship species) determine the way in which information is interpreted and presented to a considerable extent. It would be wrong to ask whether WWF is *either* a science-based *or* an ideological organization. We should not try to determine its epistemological profile once and for all. On the contrary, what is interesting about WWF as a boundary organization is that it will tend to oscillate between both options.

4 Outline of Further Research

In the first two sections we sketched the central problem with which coastal zone management in Derawan is confronted. In the first section we showed that as a result of the worldwide shift 'from government to governance' along horizontal and vertical axes the number of public and private players and of decisions-making layers with respect to natural resources management has increased quite dramatically, with all the problems involved in the fragmentation of responsibility and agency. In the second section we showed that at the same time, due to ongoing deterioration of the various interlocking coastal marine ecosystems, there is an apparent need for an integrated approach and a close cooperation among the various actors that have a stake in natural resource management.

In the third section we claimed that the problem of the growing heterogeneity of stakeholders and the need for close cooperation can only be managed successfully through 'boundary work'. In that section we first outlined the theoretical framework that is required to give this notion significance and substance, and we next illustrated the potential usefulness of this framework by some of the ethical fieldwork we did in the first half of October last year.

On the basis of this pilot study we want to sketch the following program for further research:

1. The different stakeholders involved in coastal zone management in Derawan should be mapped more fully together with the various discourse coalitions or issue networks they form. This should provide us with an overview of actual and potential conflicts, compatibilities and cooperative actions.

2. A selection should be made of the most influential boundary organizations among these stakeholders.

3. The various boundary objects that these organizations create and use should be analysed with a focus on two types of objects: alternative practices and generative metaphors.

4. On the one hand one should concentrate on the alternatives for non-sustainable water management, such as mangrove crab pen culture and silvofishery, revenue or benefit sharing and certification, seaweed cultivation (for the medical processed food, beauty and fertilizer industry), 'Rumpon' or Fish Aggregating Devices (FADs), and ecotourism.

5. On the other hand the different problem setting narratives and storylines that circulate among and between the various stakeholders should be collected and compared, and the underlying generative metaphors and cultural images of water and water management should be analysed with respect to the question whether and to what extent they frustrate or facilitate boundary work.

6. From the analysis and comparison of this alternative practices and generative metaphors strategies of frame reflection and frame restructuring should be derived that can contribute to productive boundary work and create room for shared problem solving and the development of regimes of joint responsibility.

Appendix   Interviews with respondents from local communities

In the context of our pilot research we conducted two series of interviews. In the first series we interviewed representatives from local communities. In the second series we interviewed representatives from NGO's. This Appendix is devoted to the first series of interviews (three days). A Forestry student from Yogjakarta working with TNC acted as our interpreter and guide. *Tabel 12* provides an overview of our sample.

Village	Interview	Respondents	
		Male	Female
Derawan	1	1	
	2	2	
	3	1	1
	4	6	
	5	1	
Payung Payung	6	5	
Bohe Silian	7	1	
	8	1	2
Total		**21**	

Tabel 12: Respondents from local communities

Professions:
Village officers   2
Collector   1
Fishermen   16
Handicraft   2

The focus is on fishery practices. Our questionnaire is structured as follows:

Q1. Yields
Q2. Techniques
Q3. Responsibilities
Q4. Alternatives

First day - October 6 2003 - Derawan

Threats
Threats to the environment, mentioned by respondents, include: blast fishing, cyanide fishing and the use of trawlers. In our interviews with local community members we concentrate on the use of bombs and chemicals. It constitutes a real problem. Yet, the local communities are aware of the detrimental impact these non-sustainable practices have:

"Fishermen are aware of the impact they have. They dive in order to collect the fish when using blasting or chemicals".
"The local community is aware of the detrimental impact some fishing practices have".

Possible solutions and alternatives
We also ask our respondents about possible solutions. Among the solutions mentioned are: education (of local communities); compensation (for example: larger boats); Reservations

(protected areas). When it comes to developing viable alternatives, both governmental organizations (GOs) and non-governmental organizations (NGOs) have a role to play. Both international and local NGOs are active in the area. Notably, they are involved in education. Examples of cooperation between international and local NGOs are mentioned.

> "International NGOs seek no national funding in order to avoid competition with local NGOs".

The possibilities of governmental agencies seem to be limited. According to some respondents, the government could do more:

> "The government is primarily interested in short term economical aspects rather than in structural decline of scarce resources such as marine biomass".

Others point out, however, that important initiatives were taken. The village of Derawan had received 24 boats from the government in 2002, primarily for economic reasons, that allowed them to fish farther off (and thus encouraged them to abstain from using bombs or chemicals) The number of villagers involved in eco-tourism (through the local dive resort for example) is limited. A turtle hatchery was established, but apparently it was not managed professionally. WWF has agreed to visit the island and to set up a training program.

Second day - october 7 2003 - Derawan

Yields
The general impression is that yields are bad, several respondents notice a general decline, but precise information is not availabe. Fish are sold in Tarakan and Tanjung Redeb.

Techniques
Pancing (hook); Bombs and potassium ("potash") are being used by local fishermen. When asked, fishermen deny the use of blasting and chemicals, but concede that others use these methods. There seems to be much opposition among villagers to blasting, but they lack the power to stop it effectively. One respondent admitted that he had used blasting, but stopped doing so the previous year, because the government supported him with a boat that allows him to go fishing much farther off the coast.

Responsibilities
Patrolling is difficult due to lack of means and funding. Those on board of a particular fishing boat will say that blasting and the use of chemicals was done by other boats – the use of bombs and potash is very difficult to prove. It is diffucult to catch offenders in the act. On Derawan island new facilities are being built a few meters off shore to accommodate police officers involved in monitoring and control. It is the responsibility of the military and the police to do the patrolling. A boat (ministry of forestry) that will allow officials to patrol 4 or 5 times a month will arrive in the near future. In short, there is a trend towards intensification of patrolling and monitoring of the use of illegal fishing methods. In Maleisia fish captured by using boms are not accepted in the market, due to strict regulations, but this does not apply to Indonesia.

Alternatives
The government made boats available that allow fishermen to go farther off, as an alternative to blasting and chemicals. Other alternatives: tambaks are being built for lobster and grouper fish. Tourism is an alternative, but requires special training programs. Recently, a village management agency was established in order to discuss the prospects for sustainable development with the members of the community. A meeting was held at the Kantor Dessa. The general sense is that government support is insufficient. Ecotourism could be an alternative, but the community needs government support (funding) to build toilets for tourists or training programs (English, Dive instruction). Some respondents hope Derawan Island will become like a "second Bali". People from abroad could come and visit the village. But in order to achieve this, government support is needed.
Besides ecotourism, various techniques (contrivances) are available as alternatives to the use of bombs and chemicals: such as "rumpons" (a floating hut fixed to a floating tank) and "bogons" (little huts on a platform; light is used to attrack fish). Tambaks are being built for lobster and other fish, and a sea turtle hatchery had been built near the dive resort. Adult sea turtles are released for conservation purposes and ecotourism.

Third day - 8 October 2003 - Maratua

We arrived from Derawan in the morning and went ashore at Payung Payung. Inhabitants: ± 700. Fresh water is not available on the island; the inhabitants are dependent on the rain water they collect. We visited two villages and experienced a contrast. Whereas Payung Payung seemed open and communicative, the villagers of Bohe Silian seemed much more reluctant. Coconuts and bananas are natural resources available in large quantities on the island. The first interview took place in the house of the village official ("village chief"). Others joined the conversation, and it quickly developed into a small workshop. The atmosphere was open and cordial.

Yield
The general experience is one of decline, not so much in terms of the amount of fish, but in terms of prices at the market. This increased the pressure to use non-sustainable methods.

Techniques
Fishing with cyanide, potash and even bombs is still taking place, but alternatives are used as well, such as rumpons. Home-made bombs are manufactured using fertilizer and kerosene. Fish markets in Malaysia refused to accept fish that is captured by using bombs, but they can still be sold at Tarakan and others markets in Indonesia. Respondents admitted that, like in other villages, the use of chemicals was quite common, or even taken for granted, until recently. At the moment they told us that only 10% of the fishermen in their village still used chemicals.

Alternatives
Tourism is mentioned frequently as an alternative. Respondents hoped to transform Maratua into a "second Bali". But this would involve special programs and governmental support, insufficient at the moment. It would involve language training, and villagers should be trained to act as guides. NGOs like TNC could play a role in this regard. It would also involve investments into facilities (such as toilets). Recently, a dive resort had been built on Maratua, but it went bankrupt before it could start. Tourism would involve the development of handicraft. Women showed us mats they produced. It took something like a month to produce

this piece of work. These items could be ordered by customers. The practice could be developed on a larger scale for future tourists.

Tourists could use floating houses to catch their own fish. The prospects for tourism were hampered by logistical problems - the fact that Maratua is such an out of the way area, so difficult to reach. For that reason, potential tourists were expected to come from Malaysia and the Filipines, rather than from the West.

An interesting alternative was sea-weed farming ("agar-agar"). A recent experiment (performed in 2002) to grow sea weed inside the lagoon had failed because of a disease. The cause of the failure was an item of dispute. According to the villagers, the disease was caused by fishermen who still used chemicals. We consulted a sea-weed expert and he doubted whether this was correct. The failure could have many reasons. The villagers admitted that they needed expert advice to make it work. They had the firm intention to resume their experiment next year. Sea-weed farming, by the way, was a time-consuming activity and usually regarded a task for women. Perhaps due to the activities of NGOs such as TNC, the villagers present at the meeting seemed aware of the problems facing them and quite open to consider alternative scenarios. Another alternative could be the production and selling of dried coconuts, available in great quantities on the island.