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Compliance Program Evaluation and Optimisation in Commercial and Recreational Western Australian Fisheries

Final FRDC Report – Project Number 2001/069

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Non Technical Summary

2001/069 Compliance program evaluation and optimisation in commercial and recreational Western Australian fisheries

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Objectives:

1. To undertake data collection in order to measure the level of compliance and enforcement across the range of input and output managed fisheries in Western Australia, with a view to optimising the efficiency and effectiveness of the overall compliance program.
2. In conjunction with representatives from national fisheries compliance groups, to develop national standards for the collection and reporting of fishery-specific enforcement activity levels and compliance rates.
3. To determine how levels of enforcement and compliance vary spatially and temporally, including an examination of how the level and type of enforcement activity affects compliant behaviour. Planned management experiments will be used to assess how different levels of enforcement effort affect compliance outcomes within and between fisheries.
4. To examine the usefulness of Agency VFLO data for measuring trends in compliance, with a view to extending current VFLO data collection to include compliance-specific information.

Outcomes achieved

This project provides a database that can be used to estimate trends in compliance rates for different regulations in different fisheries. This enables fisheries compliance officers and managers to make informed decisions on the priorities for applying limited resources to ensure that the fisheries are managed sustainably.

This project describes work undertaken in the field of fisheries compliance. The word "compliance" in this work always refers to conformity with regulations, sometimes it expresses a quantitative measure of that conformity, at other times it refers more generally to the subject of delivering services to ensure compliance. Compliance (in either sense) has received relatively little formal study from the sciences, which is, perhaps, surprising, when considering how integral compliance is to the normal functioning of human society. Formal

studies of compliance are most likely to be encountered in the fields of taxation, environmental law and governance, but any agency with enforcement responsibilities will tend to use the term compliance in its sense of delivering compliance services.

In the field of natural resource management, fisheries management in particular, it is increasingly necessary to establish frameworks that restrict exploitation rates to limits that can be tolerated indefinitely by the entire system being considered, as part of a wider quest for sustainability. The resources required for 'policing' these frameworks are expensive, especially in a fisheries context where the areas to be policed are extensive, the platforms required specialised and there is potential for large-scale offences to go entirely undetected.

Most measures of compliance are expressions of the number of offences detected out of the number of inspections. Such an approach may be flawed because many compliance inspections target areas where non-compliance is likely to be found, especially if voluntary compliance is the norm and compliance resources are scarce. The number of offences detected from such targeted inspections will likely be higher than those that would be detected from a random inspection program, yielding a disproportionately large number of detected offences per inspection.

This project examines the design, implementation and uptake of a simple reporting system that can be established to capture details of fisheries compliance patrol activity, and some selected data from it. From the data captured, the number of detected offences are linked with the number of fishers contacted to provide non-compliance rates for entire individual fisheries. These non-compliance rates can help managers and researchers assess whether the levels of illegal fishing within a fishery are acceptable or not. The enforcement arm of the agency can use these non-compliance rates as clear performance measures that can be scrutinised by themselves and others, and in an operational environment where priorities often have to be adjusted in the light of unforeseen circumstances, such measures provide accountable tools to assist with making changes that have the most positive impact overall. Fisheries management is always a balancing act, but using the data systems described in this project, some of the guesswork should be replaced by informed decision-making based on quantitative data.

This project was reviewed at the Australasian Fisheries Law Enforcement Conference in Canberra, 5-7 June 2001. Discussions at this workshop helped to formulate the system developed in WA.

What makes the data collection system described in this project unique is the fact that it keeps track of whether inspections are random or targeted. Two distinct non-compliance rates are determined; the random inspection non-compliance rate can be extrapolated to draw inferences about the non-compliance rate for an entire fishery. Without such a distinction between random and targeted inspections, offence trends can be interpreted in a positive light whether they rise or fall: a decrease in observed offences can be attributed to better enforcement through deterrent value and improved education etc. while a rise in observed offences can be ascribed to more effective use of compliance resources resulting in apprehension of more offenders etc. Of course the same arguments can be swapped to portray changing offence trends in a negative light!

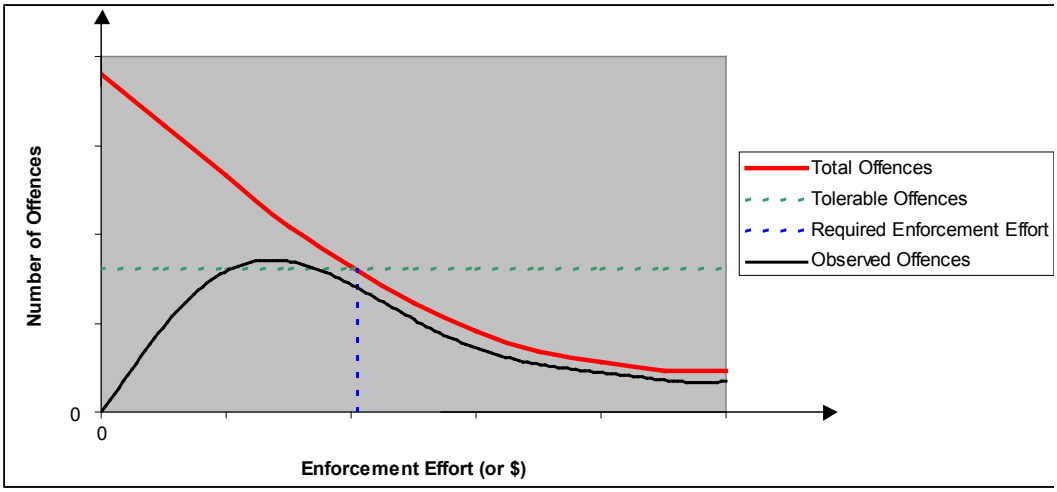

Figure 1. The relationship between enforcement effort and observed offences.

Figure 1 depicts a hypothetical relationship between enforcement effort and offences. In the real world only the tolerable number of offences (dashed green line) and the observed offences (solid black line) are reasonably well defined – yet it is the total number of offences (solid red line) that is of critical importance.

Observed offences will always be a function of the enforcement effort, and a fraction of the total number of offences committed. If the total number of offences can be reliably estimated then a threshold for tolerable offences can be defined, in turn allowing the enforcement effort required to achieve that threshold to be estimated. The non-compliance rates produced from the data system described in this project allow just such estimation to occur.

Both the establishment of the reporting system and the reporting system itself are described in this report. It will be shown that such a reporting system, like many others, benefits from a long timeline of consistent data capture. Data from the reporting system are used to illustrate the various types of information that can be captured, and how when suitably analysed and presented, it can be used within a management framework to evaluate and then optimise the delivery of compliance services.

In recent years the role of Volunteer Field Liaison Officer's has changed, instead of being akin to Fisheries Officers and undertaking patrols to identify illegal activity and provide deterrent value, they have increasingly taken on an educative role, delivering seminars and clinics in a semi-formal and structured environment. This education still fulfils an important role in the overall compliance arena – but it is not aligned with the core intentions of the compliance data collection: to estimate levels of illegal activity from classifying the types of contacts encountered during District patrols. Therefore VFLO data has not been used in this database.

KEYWORDS: Enforcement, compliance, deterrence, evaluation, co-management, database, Western Australia

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2.0 Background (TJG)

2.1 Overview

Fisheries monitoring, surveillance, and enforcement activities are an integral part of any well-managed fishery. Indeed, the failure of many fishery management programs in the United States has been ascribed to non-compliance with fisheries law (Sutinen et al. 1990). Around the world, demands on fisheries resources are increasing, requiring strict regulation to ensure that stakeholders use resources responsibly. Since some people choose to disobey fisheries law, regulations in themselves are rarely sufficient to ensure responsible resource use. Measures must be undertaken to encourage an acceptable level of compliance with regulations in order to ensure that management objectives are not compromised. An acceptable level of compliance will vary according to how particular rules affect management objectives in individual fisheries, but will generally relate to preserving resource sustainability, ensuring efficient economic returns from the fishery, and providing equitable access to all who may legitimately use the resource.

Effective regulation and a high level of compliance with that regulation has become vital in managing fisheries, but delivering effective compliance and enforcement is expensive and regulating agencies are continually seeking to minimise costs. Previous work undertaken in the western rock lobster fishery illustrated that compliance resources would be optimally utilised when enforcement effort is designed to maximise the potential for fishers to voluntarily comply with fishery rules, while at the same time providing a reasonable threat of detection, successful prosecution, and significant penalties for those who do not (McKinlay 2002). This can be achieved with a range of strategies including effective monitoring and surveillance, appropriately trained enforcement staff, suitable deterrents in the form of fines and administrative penalties, and targeted educative campaigns.

Previous work has also highlighted that a major deficiency with many enforcement programs is that they fail to adequately quantify the amount of enforcement effort, and the amount of non-compliant behaviour, that occurs in a fishery (McKinlay 2002). Without this information it is not possible to examine the relationship between enforcement effort and compliance, nor is it possible to develop realistic performance indicators to measure the effectiveness of enforcement work. This project builds on the work undertaken in the west coast rock lobster fishery during FRDC 98/156 in order to develop and demonstrate a statewide compliance data reporting system that allows managers to optimise the efficiency and effectiveness of the overall compliance program in Western Australia.

2.2 The Need for Compliance Monitoring:

In any regulatory regime, regardless of context, compliance with the regulations is a vital component whereby the intentions of the regulations are realised. Unfortunately, it is often assumed that compliance with regulations will automatically be close to 100%, while the regulatory effort can be mostly directed at fine-tuning the regulations themselves. The reality is that every regulatory imposition by a management agency is essentially an experiment: a change is introduced to the system (the introduction of the regulatory instrument), and the intention is that this change will produce the desired effect. Unfortunately for those undertaking such experiments, the experimental system is usually not understood at a detailed level, there are likely to be multiple confounding factors within the system, there usually cannot be an experimental control, nor any repeated experiments (see Acheson, 2001).

Given these factors, it is not surprising that the path of policy implementation is littered with the corpses of failed regulatory initiatives. Perhaps more surprising, is how rarely simple measures of regulatory effectiveness are introduced contemporaneously with the new regulatory initiative. It is therefore similarly rare for a regulatory agency to know whether or not the initiative is having the desired effect. A probable reason for shying away from measuring regulatory effectiveness is that doing so consumes valuable resources. A minor contributory factor could also be that such measures can provide undeniable evidence of failure.

Where good compliance with a regulatory instrument is required of those subject to it, it is imperative that effective monitoring of compliance is in place. Without that monitoring, the regulatory agency cannot be sure what level of compliance exists and so would be unsure whether any observed changes in the experimental system are due to the regulatory initiative, or some other external influence. Ideally, any such new regulations would be accompanied by estimates of explicit minimum compliance thresholds required for the regulation to be effective, these thresholds would be conveyed to the agency responsible for enforcement along with the necessary resources to ensure that the minimum level of compliance was maintained.

2.3 Maximising Compliance:

The factors that motivate an individual's choice of whether to comply with regulations are complex (Acheson 2001, Nielsen 2003), and have received much attention as agencies seek to minimise enforcement budgets, harm, social strife, and other undesirable effects of non-compliance, without unacceptably constraining individual freedom.

When choosing whether to comply or not, an individual makes a balance of choice between the incentives and disincentives for non-compliance. How an individual enumerates such a balance will determine whether they choose to comply or not – and that enumeration will be different for different individuals. However, if an individual feels that if it is more worthwhile to break the regulation then to abide by it, then they are likely to be non-compliant and break the regulation.

This point implies that an individual is aware of regulations that may prescribe what is illegal. That awareness can be lacking, which makes any non-compliance less a matter of individual choice. Although that fact is unlikely to mitigate any sanctions meted out, it can be an important factor in increasing the alienating effect of regulations on individuals.

A regulatory authority must therefore ensure that people are clearly aware of their obligations under any regulatory regime and that sufficient sanctions for non-compliance exist to offset any perceived gain from non-compliance. The important converse also holds: if sufficient benefits can be gained from compliance so as to outweigh any perceived gains from non-compliance, making the choice to comply is more likely. In an ideal regulatory framework both incentives for compliance and disincentives for non-compliance work together to enhance the compliance rate.

If reliance is placed only upon sanctions imposed as a result of non-compliance, there must be a perception amongst individuals that there is a good chance of being detected if they choose not to comply. Deterrent value has utility, but alone is unlikely to sustain high levels of compliance, since some non-compliance is inevitable and any surrounding publicity undermines the credibility of the deterrent. It is important too, that other individuals observe the fair and consistent application of sanctions for non-compliance with regulations; otherwise the credibility of the regulatory authority can be undermined. If individuals collude against

a regulatory authority, ensuring a high level of compliance is made considerably harder (McLaughlan 1994). Alternatively, when the majority support regulations and abide by them, then they can provide intelligence information to the regulating authority, so assisting them to detect the minority of individuals who are breaking the rules. The harsher the sanctions imposed for non-compliance, the greater the need for the authority of those delivering the sanctions to be impeccable. Recognition of the authority of the regulating agency is essential – without that, recourse must be made to brutal, military style enforcement strategies, which are usually unacceptable socially and financially.

Regulations are imposed to achieve outcomes and it is important that stakeholders recognise the need for those outcomes if voluntary compliance is to be maximised; otherwise there is a danger that the regulatory framework alienates some stakeholders consequently making them less likely to comply with it. It is much easier to maximise voluntary compliance if all stakeholders support the objectives of the regulations. Compensation, consultation and education are key tools that can assist in preventing alienation, which can easily result from the introduction of new regulations.

2.4 Fisheries Regulation and Compliance:

The intent of regulations generally is to achieve a safe, stable society that benefits the majority of individuals although it is relatively recently that it has been recognised that the social sciences can compete with economics as a field of interest to fisheries managers (Clay and Goodwin 1995). Unchecked increases in natural resource exploitation rates, especially of biological resources, quickly reveals that yields decline rapidly if regulatory frameworks to control resource exploitation are not implemented. Since with a renewable resource no one benefits at either extreme: that of no exploitation, or exploitation to the point of near-extinction, it makes sense that a framework is established that allows exploitation at a level at or close to the maximum sustainable yield of the resource. Such frameworks are the goal – or more often, the dream – of Fisheries Managers.

If the regulatory frameworks utilised in fisheries management are to achieve their goal, they must overcome challenges that are considerably different to those faced by other legal frameworks. This is best illustrated by the use of two examples. One is the case of property theft, the other that of fishing in a marine protected area.

Theft is universally condemned by society as reprehensible criminal behaviour. Usually the disappearance of the items will be noticed soon after the event, authorities are notified and actions can be taken to apprehend the offender and bring them to justice. Accurate data about thefts is easy to assimilate – the fact that the crime has taken place is readily apparent, those negatively affected have a strong incentive to report what has taken place in considerable detail, and since most individuals choose not to steal, regulations prohibiting theft are seen as legitimate by the large majority who also support disincentives to theft in the form of punishment. The number of reported thefts is likely to be very close to the actual number of thefts, and the nature, locations and timings of those thefts will be easy to characterise. For theft, the enumeration of the balance of incentives/disincentives results in most individuals choosing not to steal. It is interesting to note, however, that actually this choice will vary widely depending on the specific circumstances. While violent burglary would be almost universally condemned, personal use of items provided for work purposes is more likely to be deemed acceptable enough to overlook.

Considering the case of fishing in a marine park, there is typically no evidence to indicate the offence occurred, nor was any person directly negatively affected. Proxy indications of illegal activity can sometimes be derived from observations of stock abundances, but any large natural variations in stock abundance confound such indicators. The taking of fish in a marine park is not necessarily universally condemned: people living in the vicinity of the park may have traditionally fished in the area for many generations and feel they have a right to fish that takes precedence over any prohibitions imposed by outsiders. Such people may not recognise the authority of a distant regulator. They may even be ignorant that fishing is not allowed at that particular location. For the regulating agency these factors mean that there is no source of detailed information about this type of offence readily available. Patterns of illegal activity cannot be extracted, species particularly targeted cannot be discerned, and the numbers of offences and the magnitude of those offences remain unknown. The offenders are not readily identifiable to allow profiling or targeted education programs.

There is less of a distinction made amongst general citizens between serious and minor fisheries crimes: between a few fish taken illegally to eat and many thousands taken illegally for significant profit. General citizens more easily make this distinction when they are considering more familiar criminal matters: the difference between a violent burglary and the theft of a pencil from a work stationary cupboard. Sanctions imposed for fisheries crimes are therefore less likely to be recognised as fair and legitimate.

It should be apparent then, that many of the more common strategies adopted for typical law-enforcement need to be fine tuned for use in a fisheries context. There is a clear need too, for novel data collection strategies to inform fisheries managers of the extent of fisheries offences. It is this latter need that is the focus of this project – most particularly in attempting to quantify non-compliance rates in particular fisheries. The need for performance measures for fisheries and conservation enforcement programs has been recognised for some time (Côté et al. 2001, Sutinen et al. 1990, Sutinen 1996) and there is a continuing need for evaluations of enforcement (Davis and Moretti 2005).

2.5 Enforcement and Compliance in West Australian Fisheries

In 2008, the fisheries compliance program in Western Australia employs approximately 110 Fisheries and Marine Officers (FMOs) in 5 regional and 12 district offices around the state. Additionally, approximately 150 Voluntary Fisheries Liaison Officers (VFLOs) are dispersed across the State: community volunteers trained to assist and educate recreational fishers about conservation and fish management.

The six major commercial fisheries (West Coast Rock Lobster, Abalone, Pearl Oyster, Exmouth Gulf Prawn, Shark Bay Prawn and Shark Bay Scallop) operate in a fully cost-recovered management environment, which requires that licensees in these fisheries pay fees to cover the total cost of management. Cost recovery has been phased in over a number of years, with the final stage of cost recovery (100% cash costs plus capital accruals and employee entitlements) being reached in 2001/02.

Most Fisheries Officers are permanently located in the main population centres with access to appropriate platforms to allow them to undertake patrols up and down the entire coastline. Four Officers are specifically employed to undertake mobile patrols, to conduct “surprise” inspections, an activity that is particularly important in smaller towns where fishers can quite easily learn the movement patterns of local Officers.

Compliance platforms include three large patrol vessels (greater than 20 m), 8 small patrol vessels (up to 8 m), and trips aboard commercial fishing vessels. Officers utilise four-wheel-drive and all-terrain vehicles to provide access to remote and difficult terrain for extended periods. Aerial and sea patrols can also be undertaken using either shared government resources or through asset rental in the commercial sector.

Compliance activities include at-sea inspections of licences, catch and fishing gear, land inspections of catch and fish processing factories, aquaculture facilities, retail outlets, delivery routes, and educational initiatives aimed at promoting awareness of fisheries regulations. A Serious Offences Unit of between 5 and 10 officers has the task of conducting complex investigations into serious fisheries offences. Members of the public and commercial fishers are able to report instances of observed illegal activity through the "Fishwatch" system, a statewide 24-hour telephone hot line.

Volunteer Fisheries Liaison Officers (VFLOs) assist in educating recreational fishers about fishing rules and regulations for all fisheries. VFLOs are fishing enthusiasts who donate their time to educate other fishers about conservation and fish management. They are formally engaged as volunteers with the Department of Fisheries WA, and receive training on fishing regulations, fish handling and care, and habitat protection. Although VFLOs do not have the statutory powers of Fisheries Officers, they play an important educative – and possibly deterrent – role on the beaches and boat ramps of Western Australia.

Penalties for illegal activity in West Australian fisheries are commensurate with the value of the illegal fish involved, and the type of illegal activity. This can sometimes result in large monetary penalties for certain types of activity, with large penalties considered necessary in order to create a deterrent effect for high value species like western rock lobster and abalone. For example, commercial western rock lobster fishers found over-potting are fined for each pot they fish over their legal entitlement. In addition, the fisher's normal pot entitlement is permanently reduced by the number of excess pots they were found fishing with, a substantial loss considering pots currently trade at around $20,000 AUD each. Major offences also attract a "black mark" against the fishing licence; three black marks in a ten-year period can result in licence suspension or cancellation.

Breaches of fishery rules may occur for a variety of reasons, including fishing in closed waters, fishing out of season, taking protected fish, use of illegal fishing gear, illegal sale of fish, unlicensed fishing, interfering with other fishers' gear and exceeding size or bag limits. Action as a result of breaches usually fall into one of three categories according to a set of Departmental guidelines and rules set out in the Fish Resources Management Act (1994):

i. Infringement Warnings – these are written warnings issued for minor fishery offences. They do not incur a fine, but are a written record of a minor offence that may be referred to by Fisheries Officers in the future. A certain number of infringement warnings for similar offences in a designated period may result in an infringement notice.

ii. Infringement Notice – these are written notifications of a requirement to pay a monetary penalty for an observed offence. Fishers issued infringement notices may choose to defend the matter in court, however most fishers simply choose to pay the fine (the system is analogous to motorists who speed and are issued a speeding ticket). The Department of Fisheries may initiate a prosecution brief for those fishers who appear to be habitual offenders.

iii. Prosecution Briefs – these are offences of a serious nature (prescribed in the FRMA 1994)

that immediately proceed to formal, legal prosecution. Such matters often incur hefty fines, or can even result in incarceration, and matters brought before the court are often vigorously defended (especially by commercial fishers). For the commercial fishery, a successful prosecution for a serious offence may result in a "black mark" against the fisher or the commercial licence; accumulation of three black marks in a ten-year period may result in the cancellation or suspension of an authorisation to fish. The high value of commercial rock lobster licences means this law provides a substantial deterrent against serious offences.

The level of enforcement required to maintain an acceptable level of compliance at different stages of the fishing process is set through regional compliance meetings involving program managers and field staff. In accordance with the National Fisheries Compliance Committee (1999) stated commitment to collaborate with fisheries stake-holders to develop and implement fisheries policies and laws, stakeholder groups have input to the compliance program through the management advisory committee (eg RLIAC), and a Compliance Subcommittee created to specifically examine compliance related issues.

In July 2004, the Regional Services Branch assumed responsibility for the delivery of the Department of Planning and Infrastructure's (DPI) marine safety at-sea compliance program for the Perth metropolitan region. This merger of the two agencies' at-sea compliance work has resulted in greater efficiency and a strengthened service to recreational boat fishers and boating enthusiasts. Whilst marine safety responsibility remains with DPI in WA as a whole, as a service to government the Department enforces marine safety compliance in regional Western Australia during routine fisheries inspections.

In 2006 FMOs assumed the operational aspects of Regional Services Branch's joint responsibility with the Department of Conservation and Land Management (CALM, now the Department of Environment and Conservation, DEC) for delivering compliance and education services in marine parks and reserves across the State to maximise the efficiency and effectiveness of both departments' compliance and at-sea servicing requirements in marine parks and reserves.

2.6 Compliance Risk Assessments

In addition to engaging stakeholders in fisheries management through the Management Advisory Committee system, fishers and other stakeholder groups may be directly involved in setting compliance priorities through Compliance Risk Assessments. Risk assessments describe the formal process of determining threats to achieving desired outcomes from a given process. Originally arising in the business community, risk assessments examine processes that have been implemented to achieve desired outcomes, and the impacts (risks) upon the process that may deleteriously affect outcomes. If possible, it is desirable to quantify risks at each stage of the process. Risks can be ranked according to their importance, and strategies developed to minimise their effects.

The Department of Fisheries W.A. conducts compliance risk assessments every 1-2 years in major fisheries and fisheries perceived as being at high risk, and every 3-5 years in minor fisheries. This process may involve the participation of management, field-based Fisheries Officers, researchers, commercial and recreational fishers, fish processors, and representatives from other interested stakeholder groups.

There are usually two tiers to the risk assessment process – the first tier is the formal transparent process involving industry and other stakeholders. The second tier is internal,

utilising researchers, fishery managers and compliance personnel. The second process feeds into an operational plan for compliance delivery to the fishery that will allocate specific compliance assets to that fishery through space and time. By reviewing these operational plans for all the fisheries in a particular location, rational, accountable decisions can be made about deploying compliance resources and ensuring that resources are available to mitigate risks to an acceptable level. The final stage of an operational compliance plan consists of selecting 'targets'; specific persons that are deemed to be at greater risk of offending than an average fisher and these targets are actively sought out for inspection during the fishing season. Target selection is performed by analysing field intelligence from officers and other fishers, and from analysing past fishing history. By their nature, finished operational compliance plans contain sensitive information, which is made available only to authorised compliance personnel.

3.0 Need for this Study (TJG & JPM)

Compliance generally, but especially in fisheries, is expensive and both fisheries managers and fishers want a sustainable fishery where incomes are maximised and costs minimised. There is therefore a clear need to optimise compliance to decrease costs. Since it is usually naïve to assume a fishery could be self-enforcing, there is a need for the management agency to be accountable - either to the fishery that pays for the cost of enforcement, or to the general public (or both).

Some of the differences between fisheries crime and other forms of criminal activity have already been mentioned – but perhaps the biggest difference is the need for novel metrics that can account both for the frequently targeted nature of fisheries compliance, and the fact that detected (or reported) offences are usually only going to be a small fraction of the total number of offences that actually take place (Sutinen et al. 1990). Without such metrics it is impossible to really know what level of non-compliance exists in a fishery, and consequently how effective its regulatory framework is.

Fisheries enforcement and related educative activities form the basis for ensuring that fishers comply with management plans, and for the continued sustainability of fisheries. Ensuring adequate levels of fisher compliance in fisheries is expensive, and the cost of enforcement activities in most fisheries can be substantial compared with other management costs. Given the importance and expense of ensuring compliance, it is perhaps surprising that there has been relatively little published research on the effectiveness of enforcement programs (compared with, for example, fishery stock assessments or fish biology/ecology). Why is this so? One reason is that crime research presents particular difficulties compared with other areas of fisheries science. Enforcement programs often comprise a complicated mix of activities spread across a large number of fisheries simultaneously. Sampling programs to obtain measures of non-compliance are particularly problematic – enforcement activities are, by their nature, often non-random, and those being "measured" (ie. fishers) can go to extraordinary lengths to conceal illegal activity. Another reason is that enforcement personnel often do not have the scientific background or analytic skills to design sampling programs or experiments to assess the effectiveness of enforcement activity.

Despite the difficulties in conducting enforcement/compliance related research, the demand for work in this area is increasing. In almost all law enforcement contexts it is accepted that achieving 100% compliance with rules is impractical, prohibitively expensive, or impossible. Since resources directed toward enforcement activities are invariably limited, it is important to ensure that the best compliance outcomes are achieved within available resources. In Australia there has historically been little external review of how fisheries enforcement budgets are expended. This is changing, however. In the 1990's most Australian fisheries agencies began implementing "costs-recovery" of management, research and enforcement costs associated with commercial fisheries; that is, commercial fishers began bearing the costs of managing their fishery. With this shift in funding arrangements, fisheries agencies are increasingly asked by commercial fishing representative groups to justify enforcement expenditure, and to demonstrate the effectiveness of chosen strategies. Scrutiny by industry groups, provided it is at a broad level and does not impair or compromise compliance operations, can be highly desirable since it potentially focuses enforcement on the most serious problems in a fishery.

4.0 Objectives (TJG & JPM)

There were four objectives for this research project:

1. To undertake data collection in order to measure the level of compliance and enforcement across the range of input and output managed fisheries in Western Australia, with a view to optimising the efficiency and effectiveness of the overall compliance program.
2. In conjunction with representatives from national fisheries compliance groups, to develop national standards for the collection and reporting of fishery-specific enforcement activity levels and compliance rates.
3. To determine how levels of enforcement and compliance vary spatially and temporally, including an examination of how the level and type of enforcement activity affects compliant behaviour. Planned management experiments will be used to assess how different levels of enforcement effort affect compliance outcomes within and between fisheries.
4. To examine the usefulness of Agency VFLO data for measuring trends in compliance, with a view to extending current VFLO data collection to include compliance-specific information.

6.0 Methods (JPM and TJG)

6.1 Overview

It should be noted that most project resources were directed towards objectives 1 (data collection), 2 (the National workshop to develop national compliance standards) and 3 (spatial and temporal variation of enforcement and compliance). Some discussion around Objective 4 will be undertaken which illustrates why, although it appears attractive to utilise information collected by VFLOs, there are a number of barriers to doing so which must be overcome first.

6.2 Project Review Workshop conducted at AFLEC, June 2001

A review workshop to examine the objectives and methodology of this project was conducted at the Australasian Fisheries Law Enforcement Conference (AFLEC), Canberra, 5-7 June 2001. The aims of this workshop were to review the research directions proposed by FRDC 01/069, and to discuss the possibility of developing national minimum standards for the collection of compliance related information.

The workshop was conducted as a series of presentations from the Principal Investigator at the time (JPM) and state and territory regulatory authority representatives. Points of interest or debate were raised and discussed during the presentations, with an overview session held on the third day of the conference; it was during this later session that AFLEC members formulated recommendations regarding FRDC 01/069.

Overall, the workshop was successful, with useful feedback received regarding FRDC 01/069. Delegates from AFLEC were of the opinion, however, that there had been insufficient time to adequately explore the idea of minimum reporting standards during the workshop, but that the issue could be addressed within the scope of FRDC 01/069 provided suitable consultation was conducted with all states and territories. AFLEC delegates recommended to the National Fisheries Compliance Committee (NFCC) that the NFCC support a proposal for additional FRDC funding to allow the principal investigator to visit individual jurisdictions to discuss current systems of data collection and storage, and explain the system being implemented in W.A. Such a proposal was put to the FRDC, but was rejected. As such, FRDC 01/069 does not represent a nationally agreed methodology for minimum reporting standards. Nonetheless, discussions at this workshop helped to formulate the system developed in WA, and the salient points are reported in this section.

6.2.1 Background to Workshop

The current project, Compliance Program Evaluation and Optimisation in Commercial and Recreation Western Australian Fisheries, attempts to systematically measure enforcement activities and detected infringements with a view to estimating non-compliance rates in key commercial and recreational fisheries. This work extends upon the results of aspects of FRDC project 98/156 Optimising the Efficiency and Effectiveness of Enforcement to Achieve Compliance in the Western Rock Lobster Fishery (McKinlay 2002), and represents the first attempt in Australia to quantify non-compliance rates across a broad range of fisheries.

Since the project may have wider national utility, it was deemed appropriate to involve all other states at the onset to assist in providing direction. After consultation with the National Fisheries Compliance Committee (NFCC, a sub-committee of the National Standing Committee on

Fisheries and Aquaculture) it was decided that the Australasian Fisheries Law Enforcement Conference (AFLEC) would be the most appropriate forum to initiate such a discussion. AFLEC is an annual conference that draws together 2-3 key fisheries law enforcement personnel from each Australian state and territory, and New Zealand. Delegates may vary from year to year but usually comprise a mix of compliance managers and operational field officers.

Consequently, a one-day workshop to discuss the project was organised to coincide with the 28th AFLEC conference in Canberra during June 2001. Attendees included 8 senior compliance managers (NFCC delegates) and 26 compliance managers and field staff from all jurisdictions. A representative from the FRDC also attended.

Prior to the conference all delegates received a letter detailing what could be expected from the day and how they would be expected to contribute. It was requested that one delegate from each state or territory provide a short presentation on current reporting procedures for enforcement activity. A pre-conference presentation to NFCC members was provided on 4 June 2001, the day before the workshop, in order to allow issues particular to NFCC members to be discussed separately.

6.2.2 Workshop Objectives

The objectives of the workshop were to:

1. *Discuss reporting issues generic to all State compliance programs.*
   Delegates were asked to provide a description of data currently collected, how/if this data was used to measure compliance, and the types of reporting provided to industry and management.
2. *Critically examine the methods and outputs associated with FRDC 2001/069.*
   Workshop participants were provided with an overview of the type of data currently being collected in WA, and were invited to provide critical comment on whether the described methods could satisfactorily be used to meet project objectives.
3. *Discuss the development of common minimum compliance measures that might be adopted nationally.* This objective was undertaken as part of the general discussion that occurred during the workshop, and in an overview discussion that occurred on the last day of the conference.

6.3 Daily Patrol Contacts (DPC) Data Collection

The Daily Patrol Contacts (DPC) form was designed to address Objectives 1 and 3 of the project, and drew heavily on the results of the Project Review Workshop held at AFLEC in June 2001. DPC data recording was setup to be an easy-to-use, but comprehensive, system for collecting data on the inspection activities of Fisheries Officers. This section of the report details the major design considerations when developing the system, the consultation process undertaken for engaging the input and support of field staff, and the effectiveness of the system that was developed. A comprehensive data collection user manual meticulously describing the recording process has been developed and is provided to all Fisheries Officers undertaking field duties (see Appendix 5 – The DeePCee Manual v2.4 (on CD)). This, along with appropriate training, provides the basis for obtaining a statewide standardised dataset that allows spatial and temporal comparisons of activity and outcomes. In addition to describing how to collect data, the manual describes the rationale for each type of data collected, since it was important that

Fisheries Officers understand the basis for the data they collected. It also contains numerous pictorial examples, and a section answering Frequently Asked Questions.

The most significant feature of the DPC data collection is that it classifies inspection status according to whether they were random or targeted inspections. This is necessary if reliable estimates of non-compliance rates are to be derived from the number of inspections or contacts (Sutinen et al. 1990).

The DPC form and its data collection system are the core basis of "DeePCee", the moniker given to a database comprising a wider collection of departmental compliance data sets. The DeePCee database will be discussed in detail later in this report, and it is important to distinguish between DPC: the form and data collected on it, and DeePCee: a database and reporting system.

6.3.1 The DPC Form

The DPC form and the business rules for completing it were designed with several, and sometimes competing, objectives in mind. The two most important were that is should be as comprehensive as possible in recording enforcement activities and compliance outcomes, but at the same time needed to be simple to complete in the field. To this end, the system was developed to enable recording of all activities conducted across all fisheries, and this was achieved using a relatively simple paper-based method. Most field patrols can be recorded on a single A4 sheet of paper. Slightly different variants of the forms were necessary for recording enforcement work concerned with aquaculture operations, the Pearl Oyster Fishery and Marine Park compliance; but in general the objective of developing a simple to complete, yet comprehensive, system was achieved. As much as possible, the recording system was designed to be 'tick-and-flick', with an extensive range of 'tick boxes', so that only a minimum of information actually needs to be handwritten by Officers in the field.

It was also important the system be extensible, in terms of areas visited, activities conducted, or fisheries serviced, without major modifications to recording sheets or instructions. This was made possible through use of a limited, but expandable, list of areas, activity types, and fisheries.

The DPC form is comprised of four main sections (Figure 2). The Header Information records the district, date and time the patrol took place, and who attended on the patrol. The Contact Details section records areas visited on the patrol, fisheries serviced (including recreational, commercial, and aquaculture), the types of activities, and the types of contacts that occurred. This section also records the numbers and types of detected offences, as well as a record of the number of marine safety inspections conducted on behalf of the Department of Transport WA (now the Department for Planning and Infrastructure). By ticking appropriate boxes, the Vessel Check Details section records specific information about checks of commercial vessels, charter operations, and aquaculture operations. Finally, there is a section to add Comments and a signature.

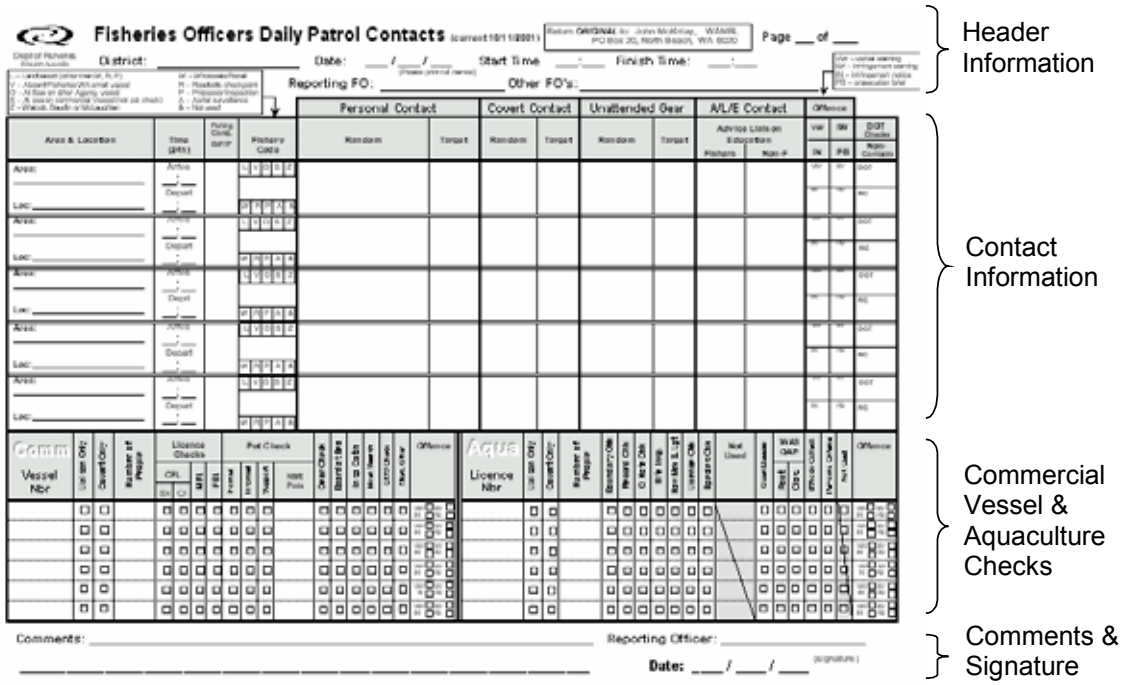


Figure 2. The Daily Patrol Contact (DPC) form, showing four main sections.

An important aspect of the form is the field labelled "Area" in the Contact Information section of the form shown in Figure 2. The DPC form allows capture of spatial information, but without using exact positioning (such as latitude and longitude). Individual districts had defined general patrol areas independently prior to this project, and these were adopted. The areas are characterised by stated geographical features, such as points, bays and beaches that are relevant in a patrol context. More precise details regarding exact location can be supplied on the form, but this additional detail is optional. Because one line is required for each fishery in any given location/area, if multiple fisheries are contacted across multiple locations, the form becomes unwieldy: 3 fisheries encountered in 6 different locations across 3 different DPC areas would require 18 lines if location is supplied, but only nine if location is omitted. Unfortunately there has been some evolution of the DPC areas as the DPC data collection has matured, and it is only recently that the boundaries have been depicted on maps to try and robustly capture the changes in areas with time. The current status of these maps is shown in an appendix to this document (Appendix 4 – The DPC areas). The use of general spatial areas rather than exact locations has a major advantage when it comes to recording and reporting data. Use of latitude and longitude is only really practical if small numbers of positions are being recorded, or if an electronic transfer of position data from a Global Positioning System (GPS) is possible. Even if such data can be captured, it requires sophisticated graphical interfaces to allow aggregated reporting against areas of interest, and that in turn requires a suitable naming/classification system. The DPC areas provide that classification system, allowing relatively simple reporting tools to suffice. It is likely that future development of the system into any electronic data capture format would retain the DPC areas and replace 'location' with an exact position fix from a GPS.

6.4 Large Patrol Vessel Data Collection

6.4.1 Overview

Enforcement activities conducted by Fisheries Officers aboard large patrol vessels are appreciably different to those conducted by land-based Officers. The Patrol Vessel Database (PVDB) is a database that was developed to capture and report on compliance field activity undertaken by Fisheries Officers operating from Department of Fisheries WA large (> 20m) Patrol Vessels. It improves upon and replaces a paper-based recording system initiated in 2000, and takes full advantage of onboard computer systems primarily used for navigation purposes. The PVDB has been designed to make recording data at sea as easy as possible, and to provide Officers with maximum access to data in terms of querying and reporting. The database is distributed as a secure (password protected), read-only product created in Microsoft Access.

6.4.2 Structure and Design

Unlike land-based enforcement staff, Fisheries Officers working aboard large patrol vessels have continual access to onboard computer systems, and this allowed great scope for developing sophisticated data capture and reporting systems for at-sea compliance activities. Since skippers are generally at the helm of a vessel, and in front of a computer even during compliance operations, the system was designed as a single integrated data entry and reporting database. Like the land-based DPC methodology, the system was developed to enable recording of all activities conducted across all fisheries.

Designing a system that could easily be used at sea presented particular challenges and the PVDB system has evolved considerably since first conception. The Department of Fisheries operates three large patrol vessels and ideally data collected by any one vessel should be available for query by any other vessel. Due to the high cost of sending data by satellite communication channels, this necessitated the development of an onshore master database. After each trip to sea a skipper generates a CD of data collected on the trip and this is sent back to database administrators, who at the end of each month issue skippers with data collected from other vessels to update their own onboard systems. While this time lag is less than ideal, investigations into other data transfer systems showed they were simply uneconomical. Maintaining a land-based master database provides some advantages, in that it allows the opportunity for compliance managers to access data collected by the patrol vessels, and allows database administrators the scope to monitor data integrity on an ongoing basis.

A second challenge associated with the PVDB was to develop a data entry interface that could be effectively used at sea in rough conditions and during compliance operations. To this end, the system was designed to require only a minimum of typing, utilising “check boxes” where possible and default settings that can be set and applied for repetitive tasks. Vessel navigation equipment is also used to automatically poll latitude, longitude and depth for entry into the database. Compared with more common compliance activities, less common types of checks are segregated into separate data entry screens. Careful attention has been paid to the screen layout of data entry items, and as far as possible Officers can complete data entry tasks without using a mouse or other pointing device.

Like the land-based DPC methodology, it was important the system be extensible, in terms of activities conducted and fisheries serviced, without major modifications to the input or reporting mechanisms. Similar lists of activity types and fishery codes to those used in the DPC system have been adopted, with modifications to accommodate compliance work particular to large patrol vessels.

The PVDB is a relational database comprised of many linked tables. Trips form the highest structure, within which are nested a Daily Log linking to compliance contacts, marine safety inspections, and various auxiliary information relating to the environment and vessel. Various lookup tables are maintained for fishery codes, activity codes, and commercial vessel details.

6.5 Consultation and Input from Patrol Vessel Staff

Consultation with patrol vessel staff was extensive during the development of the PVDB. Scientific and programming staff undertook several trips aboard vessels, the longest of which was eight days during an active compliance voyage. Additionally, several workshops were conducted to obtain feedback from sea-going staff during the design stages of development. Screen design changed considerably during this period, leading to significant improvements in usability. Fisheries Officers were also instrumental in prompting the development of many keyboard shortcut methods of entering data and moving around program screens.

6.6 PVDB Data Entry, Querying and Reporting

The PVDB has been constructed to provide a hierarchical structure to data entry. The concept of a trip forms the highest part of this structure. Each voyage to sea constitutes a trip, and here officers record information relating a complete trip. One or more days are nested within each trip, and within each day may be multiple contacts with fishers and fishing gear. Navigation buttons are used to allow Officers to easily move between trips (rarely necessary), days within trips, and contacts within days. Data entry generally proceeds in the following manner:

1. At the beginning of each trip, skippers fill out a trip log with general information relevant to the whole trip – the trip dates, Officers attending, and the operational plan.
2. Each day of the trip skippers record day-specific information such as anchorage times and locations, boundary checks undertaken during the day, and engine hours. Sea-state info and day-specific notes can also be entered.
3. Within each day, details of contacts with fishers and unattended gear are recorded.

Data input, querying and reporting screens of the PVDB are arranged as a series of seven tabbed windows, allowing most major parts of the database to be immediately accessible from any other section. The following sections provide screenshots and descriptions of each tab and associated dialog boxes for data input, querying and reporting. Personally identifying information has been removed for reasons of confidentiality.

6.7 Trip Log Tab

The Trip Log tab is the first screen to appear when Fisheries Officers log into the PVDB (Figure 3).

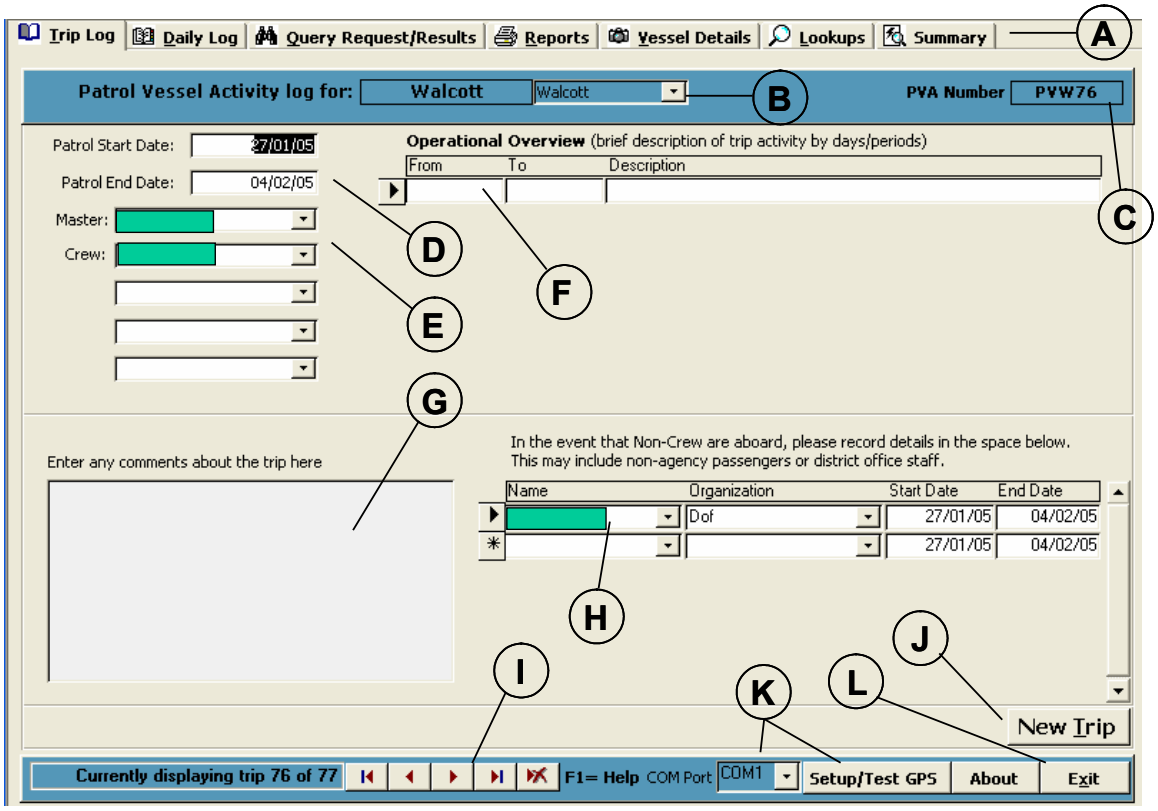


Figure 3. The Trip Log tab of the PVDB.

Salient feature to note include:

Tabs for moving between different parts of the database.

A. Indicator showing the current patrol vessel. This is set permanently for each vessel, but may be changed by compliance managers or district-based staff using the database on land-based PCs to allow viewing of data from all vessels.

B. The PV number is a unique identifier for each trip to sea.

C. The start date and end date for the patrol.

D. Record of the skipper and crew for the trip.

E. The patrol plan for the trip.

F. Trip-level comments may be recorded in this box. Separate day-specific or contact-specific comments may be recorded in sections of the Day Log tab.

G. Record of non-crew personnel attending, and the dates they were aboard.

H. Navigation buttons allow scrolling between trips.

I. The New Trip button is used to initiate data recording for a new trip to sea.

J. This allows selection of a COM port on the computer for automatically polling the vessels Global Positioning System (GPS) for determining current latitude and longitude. The Setup/

Test GPS button allows configuration of database software for querying different makes and models of GPS receivers.

L. This exits the program.

6.8 Daily Log

After entering general trip-level information once at the beginning of the trip, Officers progress to the Daily Log tab for each day of a trip (Figure 4). This screen allows entry of a variety of day-specific information, as well as contact information for each vessel or gear check undertaken during a day. This is the main screen used by Officers to record information throughout the day, and several of their suggestions were incorporated into the design. First, font sizes were increased substantially compared with other screens. Careful attention has also been paid to the layout and order of fields, so that they as naturally as possible follow the order in which information becomes available for entry. Recording of less commonly conducted compliance checks were moved to a second screen, accessible by pressing the Other Info button (labelled "O" in Figure 4). Default settings can be set and used to populate fields to reduce the data entry burden associated with repetitive task such as gear audits. Finally, a red box follows the cursor position so that Officers are always immediately aware of the current field.

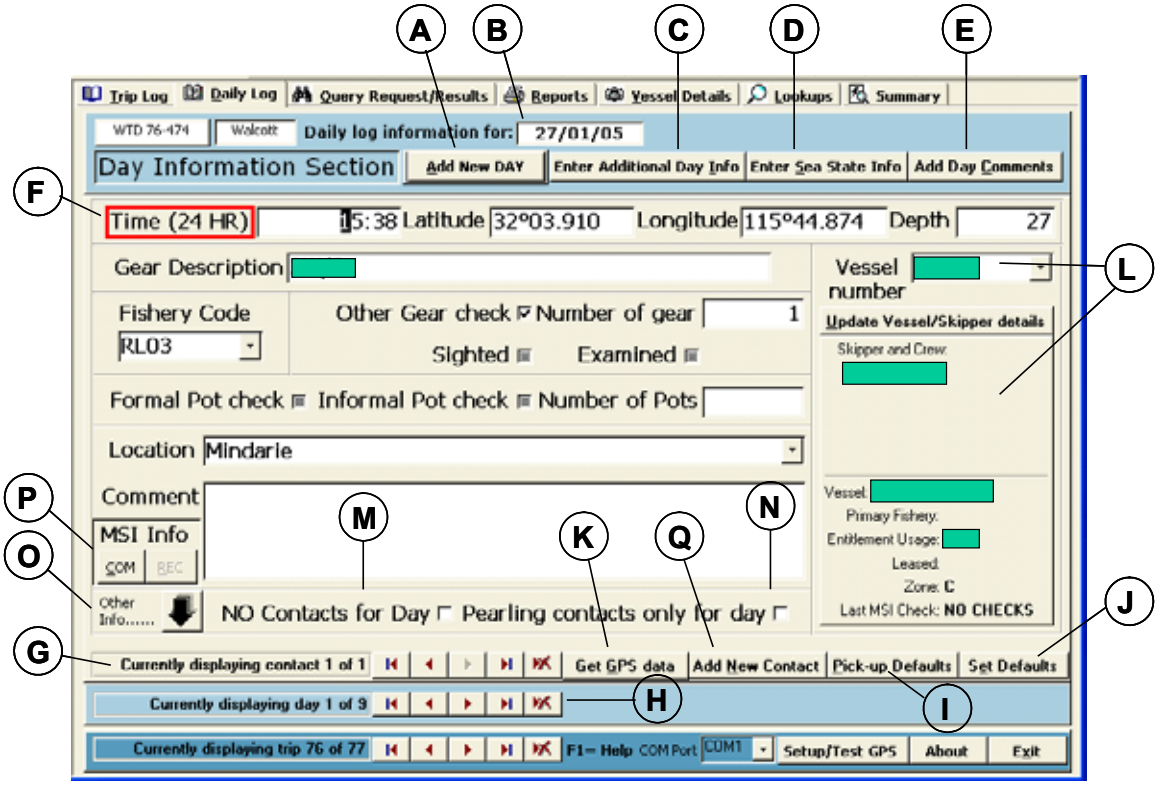


Figure 4. The Daily Log tab of the PVDB.

Relevant features of the Daily Lob tab and associated dialog boxes include:

A. This button is used to start a new day.

B. When starting a new trip or adding a new day, this field is filled with the current date from the ships computer.

C. Pressing this button allows entry of additional information specific to the day, including

anchorage details, boundary checks performed, and other information relevant to whole-of-day operations (Figure 6).

D. Sea-state information such as pressure, wind speed and swell can be periodically recorded throughout a day.

E. Add Day Comments allows day-specific comments to be recorded.

F. The time field is the first data entry point associated with recording a contact with a fishing operation. Time, latitude, longitude, depth and several other fields can be populated automatically by utilising the Get GPS button and Pick-up Defaults buttons (labelled K and I).

G. Record navigation buttons allow scrolling between multiple contacts that have been recorded for a single day.

H. Navigation buttons for moving between days within a trip.

I. The Pick-up Defaults button will automatically populate selected fields with default settings.

J. The Set Defaults button allows default values to be specified for such things as gear checks, fishery codes, vessel numbers and how GPS information is inserted.

K. Get GPS Data reads latitude and longitude from shipboard instruments.

L. The commercial or recreational fishing vessel number, or the charter vessel number. If the vessel has been inspected previously, basic information such as skipper and crew names, primary fishery, and the date of the last Marine Safety Check is displayed. Pressing the associated Update Vessel/Skipper Details button opens a form for recording various details describing the fishing operation, including a photograph of the boat.

M. Occasionally days may be spent at sea when no fishery related work occurs (e.g. during vessel maintenance or breakdown), and this check box accounts for this situation.

N. This check box is to account for days spent servicing the Pearl Oyster Fishery. While large patrol vessels facilitate compliance activities in the Pearl Oyster Fishery, work is actually conducted and recorded by specialised district office staff operating from the vessel.

O. At the request of Fisheries Officers, recording of less common compliance checks and offence information have been segregated to a separate screen (Figure 5).

P. At-sea Marine Safety Inspections (MSI) are conducted by the Department of Fisheries, and recording of this information has been incorporated into the PVDB. Recording and reporting of this information is not discussed further in this document.

Q. The Add New Contact button adds a new record to the database, and inserts appropriate default values if these have been set.

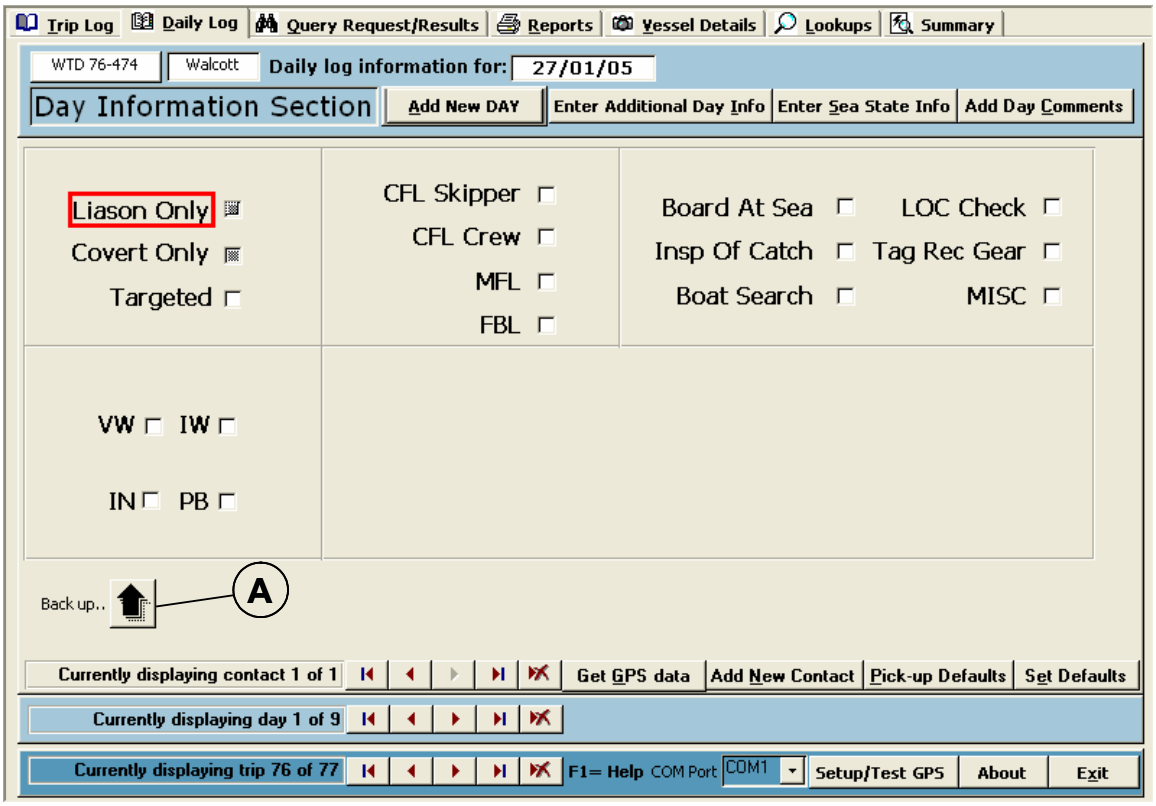


Figure 5. The Daily Log tab of the PVDB, showing less commonly used options for recording compliance checks. The item labelled “A” returns the user to the primary input screen (Figure 4).

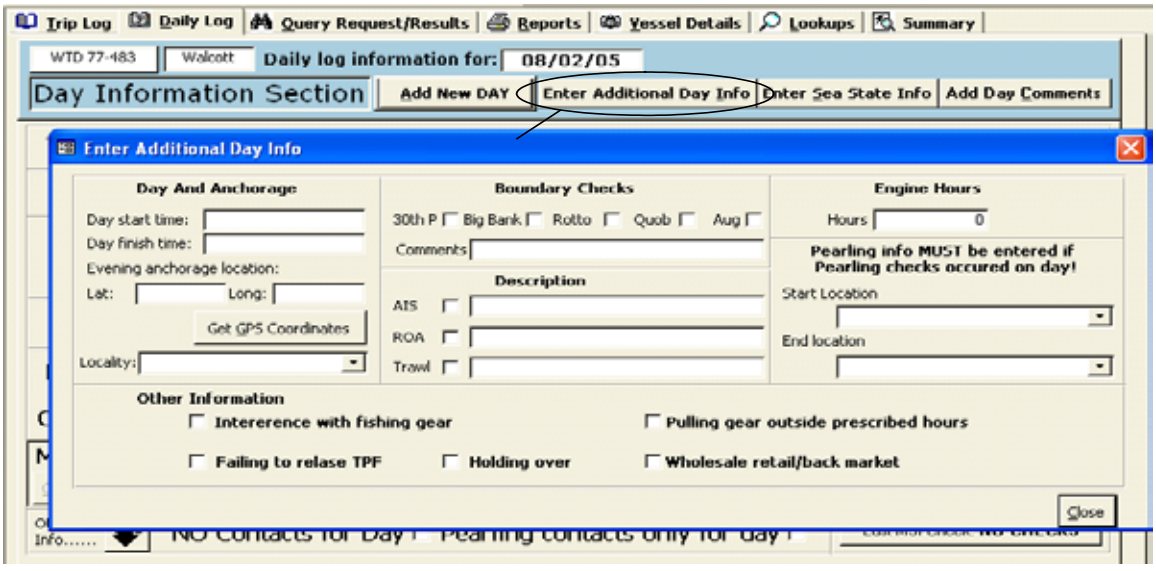


Figure 6. The Additional Day Information dialog box of the PVDB, accessible from the Daily Log tab.

6.9 Query Results Tab

The Query Request/Results tab allows Fisheries Officers to retrieve information about contacts made by any of the patrol vessels (Figure 7). Data to be displayed can be limited by specifying a number of criteria, including latitude and longitude, fishery code, date, or details specific to a particular vessel.

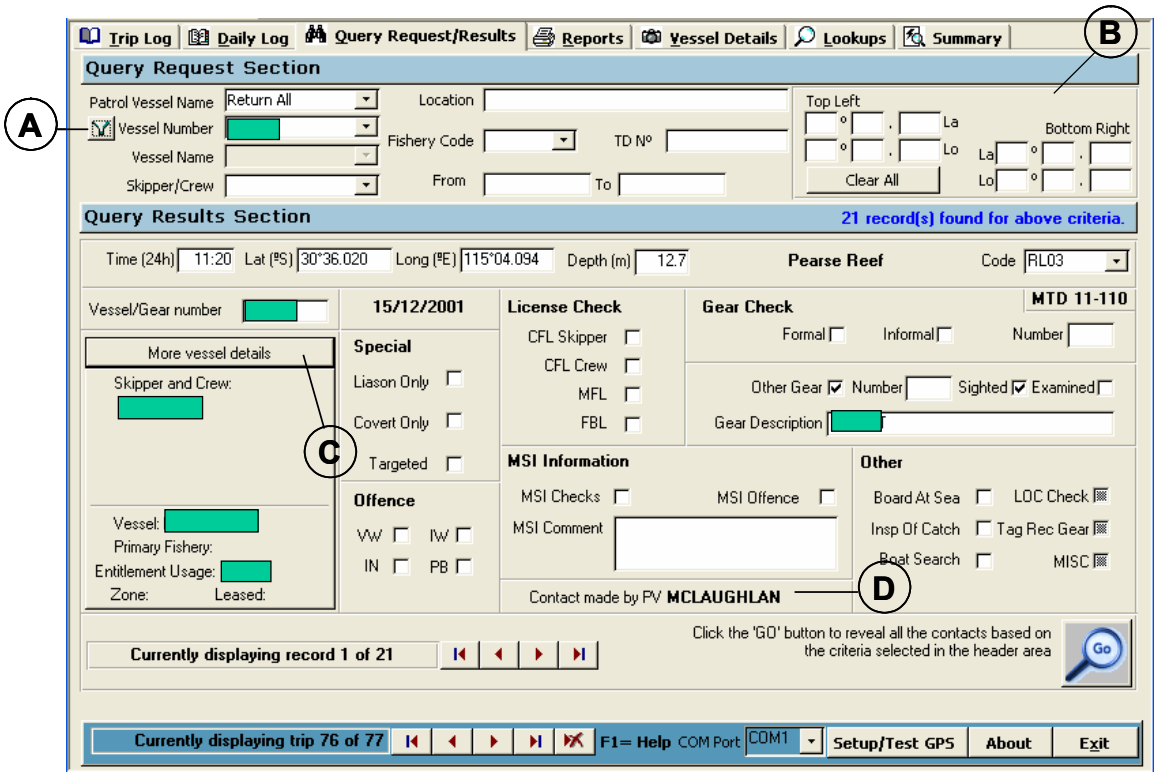


Figure 7. The Query Request/Results tab of the PVDB, allowing individual checks to be retrieved according to specified criteria.

Relevant features of the Query Request/Results tab include:

A. Exact or partial matching of the fishing vessel number to be searched.

B. By specifying latitude and longitude, allows queries to be limited to a bounded rectangle of ocean.

C. Basic vessel details are displayed for each contact. Complete vessel information can be accessed by pressing the More Vessel Details button.

D. Indicates which patrol vessel recorded the contact.

6.10 Report Tab

The reporting system for the PVDB has been designed to provide Fisheries Officers and compliance managers with a range of information to help manage and report on compliance operations. Sub-setting capabilities similar to those described in the Query Request tab allow data to be subset according to several criteria.

Nine reports have so far been developed (Table 1). Most reports include confidential information relating to commercial fishers or to the operations of patrol vessels and for this

reason an example of only one report is provided, the Contact Information Report – Unique Vessels (Figure 8). This shows a summary of contact information by fishery for a single patrol vessel, the PV McLaughlan, for the 2003/2004 financial year. Most work was undertaken in the high value commercial rock lobster fishery (fishery code RL03), and mainly comprised pot checks.

Table 1. Reports developed for the PVDB.

Report Name	Description
Trip Information	Shows a summary of trips undertaken by patrol vessels, including days at sea, commercial and recreational vessels contacted, boundary checks undertaken, and area patrolled (minimum and maximum longitude and latitude for trips).
Trip Information (cover sheet)	Reports a one-page summary of individual trips, including an operational overview and non-crew attending.
Daily Log	Provides detailed information on checks performed on each day of a trip, including location, time, types of checks and offences detected.
Gear Check Report	Reports a daily summary of gear checks undertaken by patrol vessels, including markings, location and comments on placement of gear.
Pot Check Report and Pot Check Summary	Information on formal and informal quota audits of rock lobster pots are provided in this report, including date of check, numbers of pots examined, quota entitlement, minimum and maximum latitude and longitude for placement of pots, and breaches detected.
Contact Information Report – Unique Vessels	For individual fisheries, provides a report showing summary counts of unique vessels contacted, contact types, gear inspections, inspections of catch, boat searches, and breaches detected (Figure 8).
Individual Vessel Information Report	Shows detailed inspection information recorded for individual fishing vessels in summary form.
Pearling Information Report	Reports on the dates and locations a large patrol vessel was involved in Pearl Oyster Fishery compliance activities. Detailed information on activities and results is obtainable through the DeePCee database.

FISHERIES WESTERN AUSTRALIA

PVDB - Contact Information

PV: McLaughlan

From: 1/07/2003
To:30/06/2004

Sub-sets	No of unique vessels	Special			License check	Gear						DOT check	Board at sea	Insp of catch	Boat search				
		Liason	Covert	Target		Form	Nbr	Inform	Nbr	Other	Nbr					VW	IW	IN	PB
McLaughlan																			
AI60	18	2	0	0	0	0	0	0	0	18	16	2	4	4	4	2	0	0	1
GA05	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MT06	13	0	0	0	0	0	0	0	0	15	14	0	0	0	0	0	0	0	0
MW02	14	2	0	0	0	0	0	0	0	11	9	0	0	0	0	0	0	0	1
NEF	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
RL03	359	23	3	12	11	91	962	114	1808	824	1337	8	5	5	5	0	0	1	2
R-MFB	6	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0
SP03	24	1	2	1	32	0	0	0	0	0	22	0	32	32	32	0	0	0	0
SS03	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
SW02	5	0	0	0	1	0	0	0	0	5	4	1	1	1	1	0	0	0	1
Grand Totals	442	28	5	13	44	91	962	114	1808	879	1408	11	42	42	42	2	0	1	5

Figure 8. Contact Information Report (Unique Vessels) for each fishery for the PV McLaughlan for the 2003/2004 financial year.

The PVDB reporting system is at the present time not developed to fully utilise all data that are collected, and further work in this area is anticipated. Nonetheless, considerable information is now easily accessible to Fisheries Officers and compliance managers to assist manage at-sea compliance in fisheries and ensure efficient use of the large patrol vessel fleet.

6.11 Vessel Details Tab

The Vessel Details tab provides a convenient way for Officers to search, add, or modify, details relating to fishing vessels or individuals working fishing vessels. Once a vessel is identified by any one of several search criteria, the Vessel Information dialog may be opened to allow details to be viewed or modified. Details and images of boats can be uploaded to the PVDB for future querying and viewing.

6.12 Offences Data Collection

Offence data is critical to deriving non-compliance rates, and hence to the data collections established by this research grant. It was not necessary to set up offence data collection systems as part of this project, since the department already has a suitable system. All fisheries offences in Western Australia are recorded in a dedicated offences system, which also manages the workflow associated with infringements and prosecutions. All that was required for this project was a means of linking offences back to individual patrols. To assist with the linkage, FMOs were asked to record certain additional information onto any infringements or prosecutions they instigated. Thus the fishery, DPC area, type of patrol, and whether the offence resulted from a targeted inspection are supplied on the offence paperwork. The current offences database is being upgraded, and its successor will allow FMOs to submit such data electronically. For the work reported on here, offence data was obtained by means of regular extracts from the offences system followed by manual data-entry of the additional information supplied by the FMOs on the offence paperwork. While extensive offence data is available, for the purpose of this project the severity of offence (prosecution brief, infringement notice or infringement warning), the geographic location of the offence, the date of offence, the fishery and whether the offence was the result of a targeted inspection, are the only parameters needed.

6.13 Rock Lobster Factory Inspections Data Collection

FRDC grant 1998/156 described a standardised means for recording factory inspections of consignments of Western Rock Lobster and the interested reader is referred to the final report for that project (McKinlay 2002). The present project expands that work to all the fisheries in Western Australia, and all types of compliance work (not just factory inspections). The Rock Lobster Factory Inspections Data Collection forms an important part of the DeePCee database and some of the results from the Rock Lobster Factory Inspections Data Collection are detailed later in this report.

6.14 The DeePCee Database

The DeePCee database was created to store historical data arising from the DPC recording system and the Rock Lobster Factory Inspections Data Collection, and to provide a reporting system easily accessible to Fisheries Officers and compliance managers. The database was originally distributed as a secure (password protected), read-only product created in Microsoft Access. Updates of DeePCee data were sent to District Offices two weeks after the end of each month. More recently (October 2006) the database has been made centrally available over the Department's Network. Information can be retrieved by way of several different reports, each customised using parameters, and these can be viewed on-screen, printed, or saved to hard-disk as a rich text file.

6.15 Structure and Design

DeePCee is a relational database comprising all the data resulting from the data collection systems detailed in this section – with the exception of PVDB, which remains a separate entity. The bulk of the database consists of the lookup tables and data associated with the DPC data collection, which has the most complex business rules of any of the data collections. Although they are still separate databases, the PVDB and the Offences data collections share some of the same lookup tables and in most instances are regarded as part of the DeePCee database, particularly from a reporting point of view.

Figure 9 shows the overall flow of information into and out of the DeePCee database, the types of information that can be extracted and what is available to other users. Offence data is not depicted, being essentially a stand-alone, separate entity (see earlier section on the Offences Data Collection). This project (2001/069) provided funds to establish the PVDB side of the diagram and the blue DPC and yellow Pearling Forms (which result in the green DPC data collections. Previous funding (FRDC 98/156) was responsible for standardisation of the light brown "RL03 Inspections" form – the West Coast Rock Lobster Factory Inspections form and it's database.

Marine Safety data collections are depicted here because although not relevant to this project, they do share common database lookup tables and because their integration into the DPC component has not been possible. Although the Department of Fisheries took over the responsibility for Marine Safety in July 2004, the ability to develop data reporting systems that suited the integrated compliance delivery model was stifled because of a requirement to maintain legacy DPI data collection methods. As a result development and uptake of the DPC system by compliance staff and the wider department has been slower than otherwise would have been possible.

The additional workload imposed on FMOs by the reporting systems depicted in Figure 9 presents a challenge: there is a real danger that by adding further to the administrative burden of FMOs, instead of optimising delivery of compliance services, additional reporting can actually make it less effective.

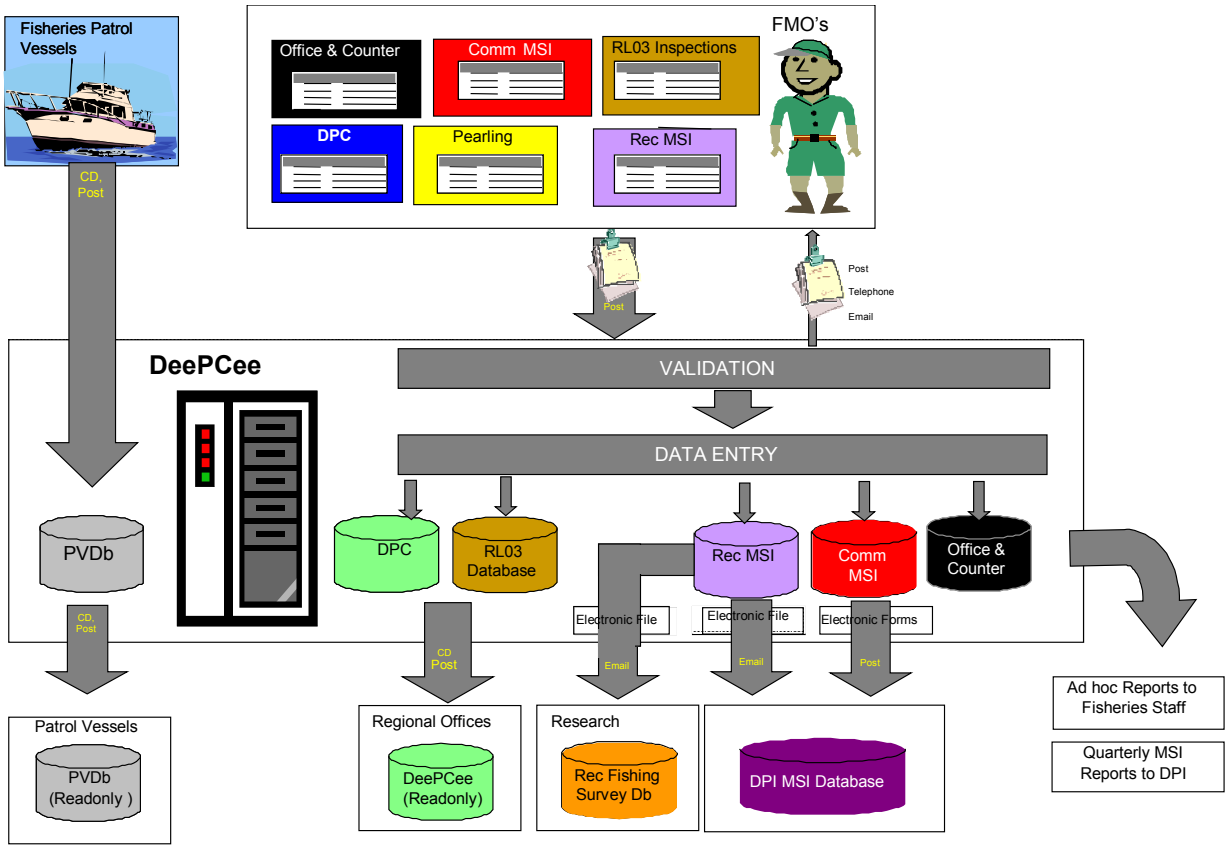


Figure 9. Schematic of the DeepCee data collection and reporting systems

As a result development of the DeePCee data collection and reporting system has been a balancing act between collecting data of sufficient detail to produce useful data for FMOs and managers, while still keeping the system simple enough to be easily accommodated in difficult field conditions. While either or both of these objectives might have been easily compromised, feedback from Fisheries Officer and compliance managers indicates both have been satisfactorily achieved. Feedback from Officers is that the DPC form typically takes 20-25 minutes to complete for an eight hour patrol, and that the advantages gained from the historical series of data this provides far outweighs the time spent in collecting the data. For example, Officers can now examine the frequency of inspection of vessels in any commercial fishery, and the spatial distribution of those inspections. This has increased the awareness among Officers of the mobility of some fleets, and the need for Officers operating out of different District Offices to be aware of inspection activity performed in other localities. While this is not to say all Officers are happy with the imposition of a data collection regime, it would be fair to say most recognise the need for quality information if compliance with fishery rules is to be adequately monitored.

The DPC system has evolved through a number of stages during the course of this project, principally due to a system of continual consultation with Fisheries Officers, but also because of changing government reporting requirements. One of the outcomes of these discussions was to investigate the use of Personal Data Assistant (PDA) technology for field data collection. Such technology had been trialled with some success by departmental research staff in conducting detailed interviews of recreational fishers. Initial investigations in 2003 concluded that screen sizes were not sufficiently large to accommodate multiple levels of data entry, as occurs using the paper-based system. This would likely result in Officers taking up to twice

as long to record the same amount of information. Additionally, a paper-based system with centralised data entry by trained staff imposes a checking and validation component to the collection of data. Officers are queried about data that appear anomalous, and this would not be possible with the relatively simple validation checks on data entry that could be imposed by using an automated technology. Standard and uniform collection of data around the state over time is vital for purposes of comparability and monitoring change, and centralised data entry is viewed as an important component in ensuring this. PDA technology was, therefore, not currently considered a suitable mechanism for field data collection, although technological developments in this area will be periodically revisited. If it becomes viable, it is likely that electronic data capture is more likely to proceed down the route exemplified by PVDB, using vehicular mounted computers to allow staff to enter details of contacts just after the encounters while travelling to their next patrol area.

The introduction of the Marine Park compliance to the FMOs role further complicated the data collection systems. It is testament to the abilities of the database manager originally engaged on this project that the core DPC data collection can be interrogated from inception to the time of writing without a break. The continually changing business environment has been one reason why PVDB has not been brought back fully under the umbrella of DeePCee, although there is another reason for this too: all the data systems in the DeePCee suite rely on paper-based collection instruments except for PVDB, which utilises an electronic user-based data entry interface. Although it is likely that DeePCee will ultimately be the end data storage for PVDB data, a separate system for data collection by the PV's will always exist and it may proliferate beyond the Patrol Vessels if a vehicle-based analogue for district officers is developed that could replace some of the paper forms. Further detail on planned future development is given later in this report (see section 9).

As of January 2008 there were 100 tables in DeePCee and 55 tables in PVDB. The largest table in DeePCee contains more than 75,000 records (each one being representative of a patrol visiting a particular area or making contact with a particular fishery – the result of some 24,000 patrols undertaken over the seven-and-a-half year period. DeePCee and it's related reporting systems have become integral to compliance management in Western Australia, and continued work to optimise database connectivity and reporting is planned.

7.0 Results and Discussion (TJG and JPM)

7.1 Project Review Workshop, June 2001 (Objectives 1 &2) (JPM)

7.1.1 Summary of Discussions

This section provides an overview of the issues that were discussed on the day, points of concern raised by particular delegates, and answers provided by speakers by way of clarification or explanation. It was generally acknowledged by the end of the workshop that there had been insufficient time available to properly explore some important issues. Pertinent comments not receiving enough time for proper debate have been expanded upon in this document. This section was circulated to State representatives after the conference and additional comments or modifications were made as appropriate.

7.1.2 Reporting issues generic to all State compliance programs

One delegate from each state and territory provided an overview of current data collection and reporting procedures. All states currently undertake some form of data collection, although there exists considerable variation between states in the quantity and quality of the data recorded. This is in part due to the significant differences between states in the amount of coastline that must be patrolled, the number of fisheries officers employed, and the level of reporting required by industry. Those jurisdictions operating under the principles of cost-recovery maintained, in general, a higher level of data collection and reporting.

Jurisdictions also vary in how data are used. In some instances data are used for internal agency use only, in others the data is used for management advisory committee reporting, and in others the data is reported to the Australian Fisheries Management Authority under compliance service-provision agreements. Some agencies collect particular types of data in order to maintain long-term historical databases.

General points of interest arising from the presentations included:

1. Some states are basing compliance program development and planning on risk assessments, and these are increasingly incorporating resource interest-group participation. These generally prioritise compliance threats with respect to sustainability, but may incorporate assessments of other types of risk that may arise from particular practices, including:
   i. Threats to industry and equity among resource interest groups; and,
   ii. Threats to the management agency (eg. OHS concerns, reputation, loss of corporate knowledge).
2. All states currently collect data via paper-based systems carried in the field, although some states (SA, WA) have considered electronic field-recording systems (eg. Personal Data Assistant (PDA) technology). For FRDC 01/069, Western Australia has settled on a paper-based recording system, although future trials of electronic recording devices are not discounted. Currently most states operate daily or patrol-based "running sheets" from which data are later extracted to summary sheets. Many states maintain data on Excel spreadsheets, although some have developed dedicated databases for this purpose (eg. South Australia, or the "Mermaid" system in Tasmania).
3. Many agencies deemed licence checks an important part of their compliance operations, and

some states have service level agreements that require all commercial operators have their licences checked at least once per year.

4. The question arose as to the likelihood of fisheries officers misreporting figures in order to achieve industry or management expectations. While some delegates conceded this was possible in some circumstances, most thought it was unlikely to occur providing sufficient safeguards were introduced to any data reporting system. Types of checks that may prove useful in this respect include requiring more than one officer to attend on any given field patrol (a requirement in many agencies), central validation and entry of activity data, verification of patrol activity by supervising fisheries officers, and GPS units on agency vessels.
5. Although there was some overlap in the types of information collected by states, there is considerable scope for standardisation, particularly with respect to terminology used for particular compliance activities. There appeared some divergence about the accepted definitions of targeted and random compliance inspections, and in what context they could be usefully applied (eg. to fisheries, to activities, or to individuals). No clear consensus was reached on this point, but it is worth at this point articulating the approach adopted by WA.

For the purposes of FRDC 01/069, WA has adopted the following terminology:

Definition: Random Contact
A random contact is one in which no prior information was used to influence a decision to inspect a particular fisher.

Definition: Targeted Contact
A targeted contact is one that is initiated because available information indicates that an offence may have been committed, or may be more likely to have been committed, and the fisher is chosen for inspection on that basis. "Available information" includes intelligence received from the public, other fishers, Serious Offences Units (operational unit designed to deal with serious, often organised, fisheries crime), as well as an individual Fishery Officer's knowledge of the past activities of particular fishers. Note that you cannot "target" a fishery – targeted contacts only occur when individual, specific people are chosen for inspection based on information received.

Some states adopt the term "targeted" to refer to work undertaken in specific fisheries – for example, perceived problems in a crab fishery may lead to that fishery being "targeted" for attention. In our opinion, this usage should be discouraged, since directing attention toward a particular fishery is simply setting activity priorities (such as may occur as the result of a risk assessment).

6. In an effort to promote use of consistent terminology, it is also helpful to define the terms compliance rate and non-compliance rate. These terms refer to the proportion (i.e.. in the range 0-1) of fishers in a defined group that, on the basis of random inspections, were found to be observing fishing rules (compliant) or not (non-compliant). Note that the compliance rate is simply 1 minus the non-compliance rate, so the two terms are essentially interchangeable providing this subtraction is performed. Rates can also be converted to percentages simply by multiplying by 100. For example, a non-compliance rate of 0.1 indicates that 1 in 10 fishers, or 10%, of those fishers inspected were found to be breaking fishing rules; it follows that 90% of fishers were compliant with rules based on the inspections performed. Providing these inspections were a random and unbiased sub-sample of fishers from some larger fishing population, then it is reasonable to extend the inference of 10% non-compliance to the larger fishing population.

7. The issue was raised that there is a need for a level of policing presence without any obvious outcome (ie. a deterrent effect), and that this imperative should be made clear to industry in the co-management process. In other words, the deterrent effect caused by an active field presence may be desirable over and above any need to apprehend offenders.

7.2 Methods and outputs associated with FRDC 2001/069

A presentation on FRDC 2001/069 was provided, including an overview of the desired outcomes, the proposed mechanisms to achieve these outcomes, and the project outputs. Delegates were invited to provide comment on whether the described methods could satisfactorily be used to meet project objectives. The principles of conducting planned management experiments were explained, and examples of previous work undertaken in the western rock lobster fishery (FRDC 98/156) were provided. An overview was provided of how data was currently being collected in WA, the types of activities and fisheries being recorded, and how data will integrate with a separate prosecutions system.

Many of the points discussed in this section of the workshop have been noted in the previous section, but additional points include:

1. Most delegates recognised there may be considerable problems associated with data collection systems that impose unreasonable administrative burdens on field-based fisheries officers, and that there is a trade-off between measuring the efficiency of compliance programs and actually reducing the efficiency of programs through restrictive recording practices. In short, recording systems need to be simple to operate, and must work well in high volume (in terms of fisher contacts) situations.
2. As mentioned previously, some delegates raised a concern that in some circumstances a small number of fisheries officers may misreport figures in order to achieve industry expectations. Perhaps a key method to reduce the likelihood of this occurring – and one not mentioned previously – is to ensure that any database arising from data collected by officers is made available to officers. This serves two purposes:
   i. It enables a review mechanism of the work undertaken by individuals (informally by peers, and formally by compliance managers); and,
   ii. It provides a valuable source of data for officers to access in their day-to-day compliance duties (eg. where, when and by who was a vessel checked in the last 6 months, and what was the result of those checks). This is particularly valuable when dealing with mobile fleets that may be serviced by many different fisheries officers working in different districts of the state.

Making data available to fisheries officers also serves as an incentive to increase data quality, since officers can see the practical value of their data gathering. One problem with this approach, however, is that some officers, because many are field orientated, may not be entirely comfortable with new technology and computer use in general. This imposes a requirement that any computer system to access the data must be simple to use and in general assume a low level of computer literacy among some of the potential users.

7.3 The DeePCee Database (Objectives 1 & 3) (TJG)

7.3.1 Consultation and Input from Fisheries Officers

An extensive period of consultation with Fisheries Officers around the state was undertaken at the beginning of the project to discuss the design and proposed implementation of the DPC system. In hindsight, this was essential to the success of the project as it encouraged ownership of the system, and refined methods for recording data under often-difficult field conditions.

One interesting aspect of this process was the suspicion with which Officers viewed the collection of compliance related statistics. Their concern was that the system would be a 'Big Brother', and would be used to their disadvantage as a staff measurement tool. The goal in these discussions was to convince Fisheries Officers that the advantages offered by the system would outweigh any disadvantages. This has indeed been the case, with Officers increasingly finding the reporting tools a useful resource in conducting compliance activities. For example, Fisheries Officers are now able to efficiently retrieve the inspection history of all commercial vessels operating in WA; who conducted the checks, where they occurred, what was done, and what was found. Reporting tools have also proved invaluable for providing industry a greater level of detail of monitoring activities conducted in fisheries.

The temptation for senior managers to use data from reporting systems such as DeePCee for performance management should only be indulged with great care. If staff realise – or even suspect – that the data that they provide is being used against them, there is a risk that they may begin to subvert the process. It is preferable to have dedicated, stand alone performance management reporting systems, rather than trying to piggyback performance management onto an existing system. This issue is compounded for a system such as DeePCee because metrics such as contact rates and infringement rates can easily be derived for individual officers and it might be tempting to think that a greater number of infringements might be an indication of a more effective officer. Cursory analysis of such statistics is unhelpful since there is no record of the nature of those contacts or the severity of offences. In short, summary data cannot be used to 'reverse engineer' micro-detail about the performance of individual officers.

A diligent officer may not make many contacts on a particular day because of the complexity of the inspections that they do make. Similarly, instigating major prosecution action can take much longer than issuing infringement warnings. While a record of field activity might be an important component in assessing performance, line-managers are encouraged to use DeePCee information judiciously for this purpose.

7.4 Reporting from DeePCee

The DeePCee database allows two basic methods of analysis to be pursued. Data can be used by field staff for detailed review of activity, and it can be used by senior staff, both operational and managerial, to produce aggregated data to assess compliance delivery, evaluate its effectiveness and optimise allocation of enforcement effort. As with any data collection system, there are inherent assumptions, biases and limitations to the data that must be understood and explicitly stated if the reports are to be interpreted correctly. Even if it is not possible to rectify any biases in the data collection, the analysis of time series data can still be very valuable - providing that collection methods do not drift over the time-span of the data collection.

Detailed reports can essentially re-create all the detail provided on the original data collection instrument. These are most useful when specific historic information is required: eg, what checks were performed on a specific fishing boat, when, where and by whom were those checks carried out? This sort of information has the clear potential to be very useful in an operational context. However, it must be noted that operational compliance staff are not data analysts, so it is a pre-requisite that the information can be extracted easily if it is to be used by those who need it. Also, it is important that such data be up-to-date if they are to be useful in an operational context. So far, the biggest barriers to routine use of the reporting systems by field-staff have been that not all the data reports are easy to extract, and that often the data has not been sufficiently up-to-date. This latter point is especially difficult to overcome in a jurisdiction as geographically extensive as Western Australia.

Trend data is less impacted by the need for data currency, although it takes time to build up a data repository that can be used for reference comparison. By comparing current levels of activity to historic levels, judgements can be made about resource levels required to attain certain outcomes. Benchmarks can be established that allow experimentation to take place regarding the levels of resources that are required to achieve certain compliance levels. Knowledge can be gained about what levels of patrol activity are required to achieve certain compliance outcomes. But it must be noted carefully that it takes a long time to reach this stage of data maturity. As mentioned, drifts and biases can confound trends, and because the timescales are necessarily long (typically years), such errors can creep in unnoticed.

Nonetheless, providing these limitations are recognised, there is much to be gained through long-term collection of data, but it should only be undertaken if it can be adequately resourced and all involved are prepared to bear the costs in time and money, associated with the exercise. A complex data system such as described here and represented by DeePCee, would typically take 12-18 months of consultative preparation and IT work to set up, 2-3 months training with a workforce as spatially dispersed as exists in WA Fisheries FMOs. This is all prior to data collection commencing. Given that trend information necessarily relies on analysing more than 3 points, and most fishing seasons are annual, it can be seen that at least four years is required from the start of the project before significant management decisions can be undertaken on the basis of the trends in the data collected, and major changes in the way compliance is delivered are likely going to require the trends to be reinforced by even more data – probably an additional 1-2 years. So a senior management buy-in for approximately six years is required before such a project as this is likely to reach maturity and fully repay the investment made in it. Additional complications such as staff turnover and changing responsibilities in the government landscape, such as have been encountered in this project, inevitably extend that duration still further. It is not surprising therefore that the trend information presented in this section really represents a data collection system only just reaching maturity. On the other hand, detailed data from a patrol reporting system can be accessed as soon as it has been established and the data made available, so the return on investment from such a system gradual increases from ~2 years from the commencement of the project.

The data collection and reporting systems established by this project have proven invaluable to senior staff seeking aggregate information about compliance delivery. However, a significant gap has emerged between those who provide the data and those who find the data useful. This is particularly unfortunate for a complex reporting system since only by giving reporters ownership of the data will they have a sense of it's worth, and devote the necessary care and attention to it's collection to ensure that it is as accurate as possible. This in turn manifests itself as a risk to other users – those senior staff analysing aggregate data - because without proper

ground-truthing of the detailed data, errors and assumptions inherent in the data collection process can escape detection when only aggregate data is viewed. This problem is inherent in all reporting systems, but it is pertinent to this study in particular because the data collection system was so complex, and so radical in thinking when first rolled out, that it represented a paradigm shift in the way the officers had to approach their core business of delivering compliance. If there is an advantage to the change in Principal Investigators and the length of time it has taken to write this report, it is that it has given a longer time period over which the project can be evaluated.

In hindsight, it is clear that too much original effort was spent focussing on developing methods for collecting the detail of compliance patrols, with too little effort spent on creating useful reports from that detail. Clear articulation of the complex business rules was also lacking, as was validation and audit that those business rules were being uniformly interpreted and applied by all reporters. As a result reporters were confused as to how to correctly report on detail, and aggregate reports were doubted and misinterpreted. Together these factors have resulted in major simplifications of the data collection process as the system has matured. The focus now is not on the detail of what checks were performed (placing more trust on the reporting officers that appropriate checks were performed), instead capturing the broader scale of each patrol: the locations visited and fisheries checked. It is a compromise: more detailed data is nearly always desirable, and often required, but if that detail is incorrect, it is worse than not having it all.

Fisheries compliance is a highly operational activity and capturing high levels of detail interferes with that activity unless it can be carefully and seamlessly integrated into the delivery of the compliance. Jumping out of a RIB with an A4 clipboard in one hand and a pen in another to begin recording information is not what fisheries compliance in Western Australia is about. Attempting to do so seriously jeopardises the informal rapport that experienced fisheries officers rely on to obtain intelligence from the fishers that they contact. In the experience of the author (TJG), this is referred to as the 'traffic warden' syndrome. FMOs believe that if they are seen as being overly officious and authoritarian, fishers choose not to supply voluntary information to them that could be useful in apprehending those breaking the rules. Since there are very few FMOs compared to the number of fishers, and the locations that they can be at any one time – such voluntary information from fishers is undoubtedly critical to apprehending offenders.

It is conceivable that in other jurisdictions, good relations between fishers and Fisheries Officers may not be as critical in effectively countering illegal activity (for example using extensive remote surveillance to target interceptions). In that case it would be possible to capture extensive data about each contact and the inspections undertaken and consequent offences detected. Modern advances in technology can potentially also assist in this regard – but the reality for a small, specialised agency such as the WA Department of Fisheries, is that the efficiency savings to be gained by capturing and using such levels of detail are not outweighed by the investment in ITC hardware and software required to produce a useable product that integrates easily with the delivery of compliance inspections.

The remainder of this section will be devoted to the different types of reports that DeePCee data can provide.

7.5 Detailed Reports (Objectives 1 & 3) (TJG & JPM)

7.5.1 The User Reporting System Within DeePCee

The DeePCee reporting system is a sophisticated yet relatively simple mechanism for sub-setting and aggregating DPC data. The user has available a variety of reports to choose from, and a series of drop-drown selection boxes allow data to be appropriately sub-set (Figure 10).

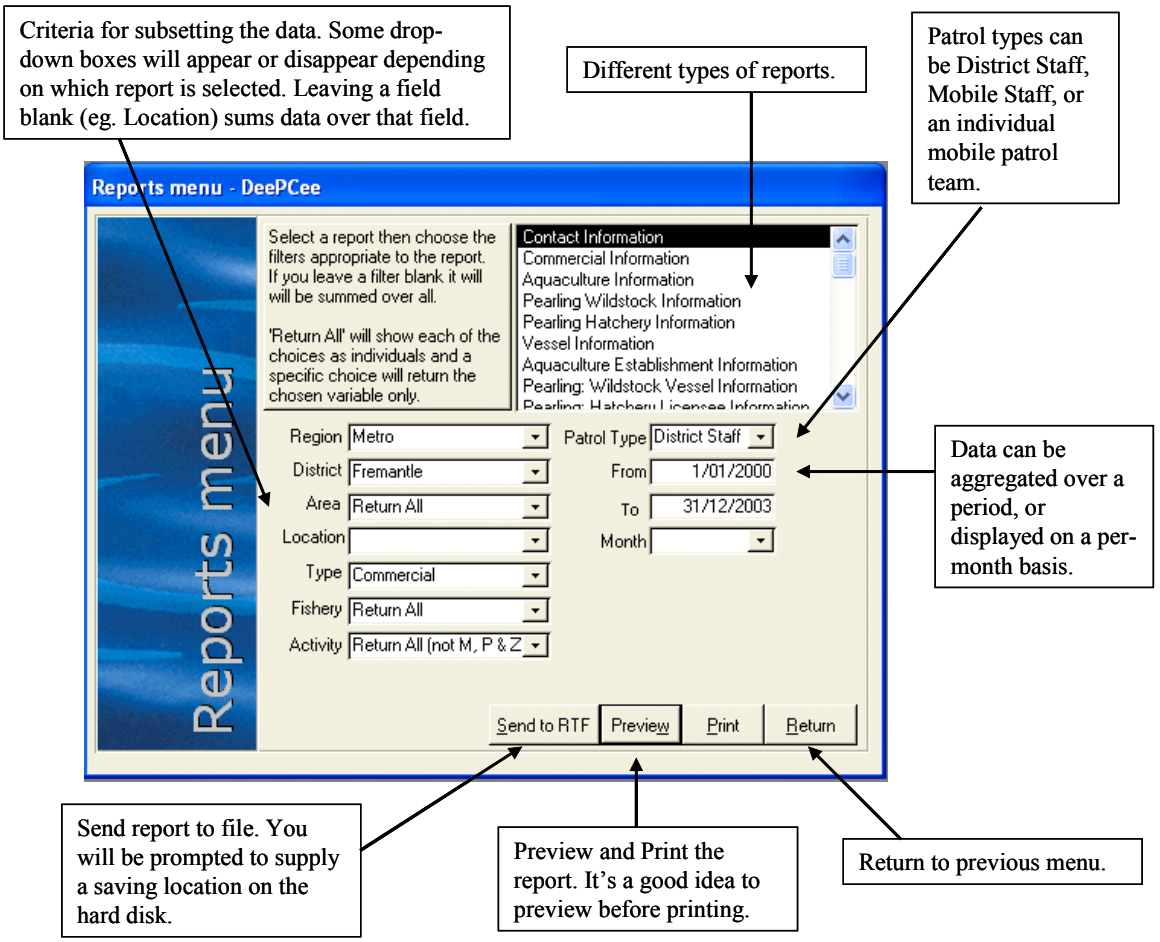


Figure 10. Report selection screen from the DeePCee database.

There are three types of choices for the drop-down selection boxes:

1. Choose a particular value (e.g. Region = Metro, District = Fremantle). This will limit the report to just those selections.
2. Choose Return All (such as Area = Return All). In Figure 10, this selection will return data for each DPC Area defined within the Fremantle District.
3. Leave a box blank (such as Location), which will cause the system to aggregate data over this variable. For example, Location = Return All will return data for each Location within each Area, but Location = Blank will sum information over all Locations within each Area.

Further drop-down selection boxes allow data for district-based staff or mobile patrols to be examined separately or jointly. Date ranges can also be selected. Eleven main reports have been developed in consultation with Fisheries Officers and compliance managers (Table 2). Several

other administrative reports are available to allow Officers to easily extract lists of fishery codes, Areas and Locations. Further discussion is restricted to three main reports, namely the Contact Information Report, Commercial Information Report and Vessel Information Report.

Table 2. Description of reports developed for the DeePCee database.

Report Name	Description
Contact Information	Returns information gathered on the upper portion of the DPC form, including random and targeted personal contacts with fishers, targeted and random covert contacts, random and targeted checks of unattended fishing gear, and Advice/Liaison/Education contacts. Offences detected from these contacts are reported, as are effort statistics (numbers of days, hours, and officer-hours worked in a locality).
Commercial Information	Returns information gathered on the lower part of the DPC form relating to checks of commercial vessels, including numbers of vessels checked, summaries of various checks performed, and offences detected.
Aquaculture Information	Reports on inspections of licensed aquaculture premises, including licence inspections, boundary checks, navigation markings and light, species checks, and offences detected.
Pearling Wildstock Information	This report summarises inspection activities of wildstock pearl oyster, including license checks, audits of authorities to transport and hold pearl oyster, counts of oysters held on farms, inspections of vessels engaged in pearl oyster fishing, and offences detected.
Pearling Hatchery Information	Information relating to hatchery-reared pearl oyster includes nursery, hatchery, quarantine and transport inspections, nursery audits of shell held, disease checks, checks of broodstock collection, and offences detected.
Vessel Information	Returns information on individual vessel inspections in commercial fisheries, and charter operations: who did the inspection, where did it occur, checks performed, and breaches detected.
Aquaculture Establishment Information	Similar to the Vessel Information report, this reports on individual aquaculture establishments. Includes boundary checks, record audits, site inspections, navigation markings, species checks, and offences detected.
Pearling Wildstock: Vessel Information	This report is used to query checks on individual vessels in the wildstock fishery for pearl oyster: who did the check, where, what was done, and breaches detected.
Pearling Hatchery Licence Information	Reports on individual licensees involved in pearl hatchery production. Again, reports who did the check, where, what was done, and breaches detected.
Officer Report by District	Within a given period, reports for each district Officers conducting fieldwork within the period, providing dates and a reference to the DPC sheet completed.
Officer Report by Officer	Within a given period, reports for each Officer work conducted in various Districts, including dates and reference to the DPC sheet completed.

7.6 Contact Information Report

Contact reports return information gathered on the upper portion of the DPC form. Reports contain header information showing which variables were chosen to produce the report, including the date range, region and district, fishery and activity type. The rows of the report show nested levels of region, district, area and location, depending on which are chosen.

Fishery codes and activities are nested within spatial information if more than one fishery or activity is requested.

Column headings represent the contact information recorded in the upper part of the DPC form. In order of appearance, they are: RPC – random patrol contacts, TPC – targeted patrol contacts, RCC – random covert contacts, TCC – targeted covert contacts, RUG – random unattended gear contacts, TUG – targeted unattended gear contacts, ALE-F – advice, liaison, education contacts of fishers, ALE-NF – advice, liaison, education of non-fishers, VW – verbal warnings, IW – infringement warnings, IN – infringement notices, PB – prosecution briefs, No of Days – number of unique days on which activity took place. Totals are provided at the bottom of the report.

Row headings are firstly subsets of the areas of interest (the Region and the District), followed by the fishery type (Commercial or Recreational) and a code for the specific fishery (in the example below RL03 represents commercial rock lobster). Finally, there are breakdowns of the individual activities undertaken (L = General Land-based, R = Roadside Checkpoint, S = At Sea on a Commercial Vessel, V= Aboard a Fisheries District Small Vessel, W = Wholesale/ Retail Premises Inspection).

As an example, consider the information for all compliance activities conducted by district-based staff in the commercial rock lobster fishery in the Midwest district of Geraldton for the 2001/2002 rock lobster season (Figure 11 and Figure 12).

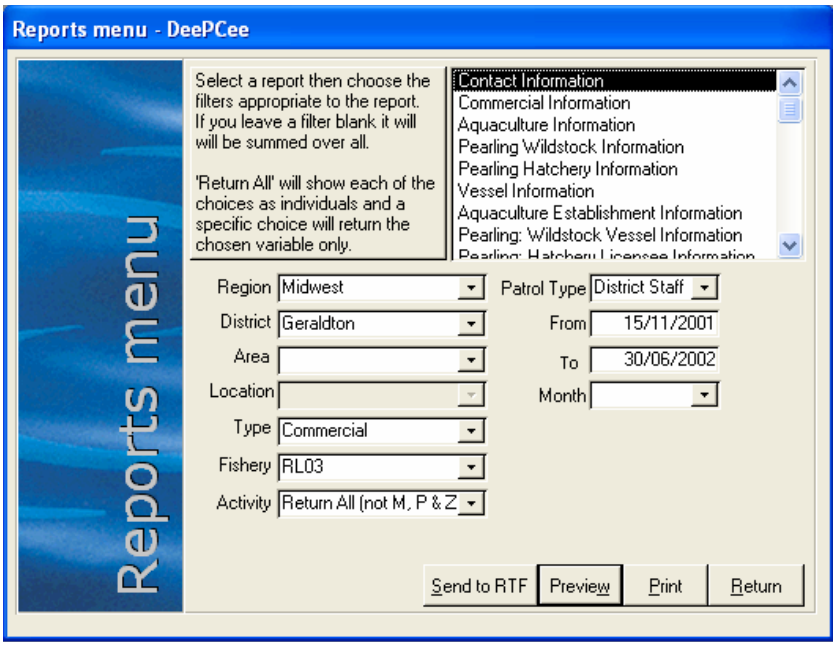


Figure 11. Report selection for compliance contacts by district-based staff in the commercial rock lobster fishery in the Midwest district of Geraldton for the 2001/2002 rock lobster season.

FISHERIES WESTERN AUSTRALIA

DeePCee - Contact Information

REGION: [Midwest] DISTRICT: [Geraldton] TYPE: [Commercial] FISHERY: [RL03]
ACTIVITY: [Return All (not M, P & Z)]
PATROL: [District Staff]

From: 15/11/2001
To: 30/06/2002

SUM	ACTIVITY	RPC	TPC	RCC	TCC	RUG	TUG	ALE F	ALE NF	VW	IW	IN	PB	No of days
Midwest														
Geraldton														
Commercial														
RL03														
	L	121	13	162	34	1	0	35	5	0	2	0	1	74
	R	4	3	0	0	0	0	0	0	0	0	0	0	2
	S	2	0	0	0	0	0	0	0	0	0	0	0	2
	V	18	3	12	4	32	9	65	20	2	0	0	0	26
	W	21	0	6	0	0	0	0	1	0	0	0	0	5
	Grand Totals	166	19	180	38	33	9	100	26	2	2	0	1	109

Figure 12. Report results for compliance contacts by district-based staff in the commercial rock lobster fishery in the Midwest district of Geraldton for the 2001/2002 rock lobster season.

Results show the distribution of contact types according to the type of work conducted. This shows, for example, how prior information about possible illegal activities is used. Approximately 10% of contacts with fishers arose because of prior information, with 19 targeted personal contacts (TPC) made compared to 166 random personal contacts (RPC). Of note, more covert contacts (RCC + TCC) were made compared with face-to-face (personal) contacts. In Western Australia, such information is routinely conveyed to commercial fishing representatives involved in the management process in order to accurately convey service levels conducted in fisheries.

As a second example, consider compliance contacts in the recreational abalone fishery by district-based staff in the Perth Metropolitan Region occurring during the period 4/11/2001 to 9/12/2001 (Figure 13 and Figure 14).

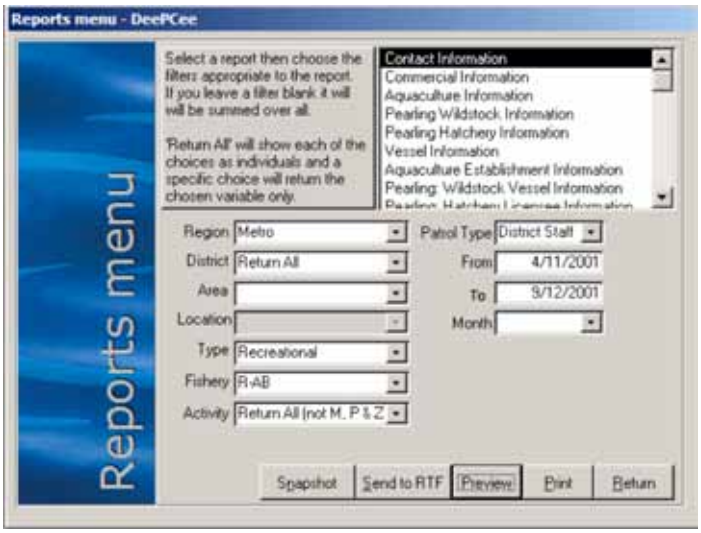
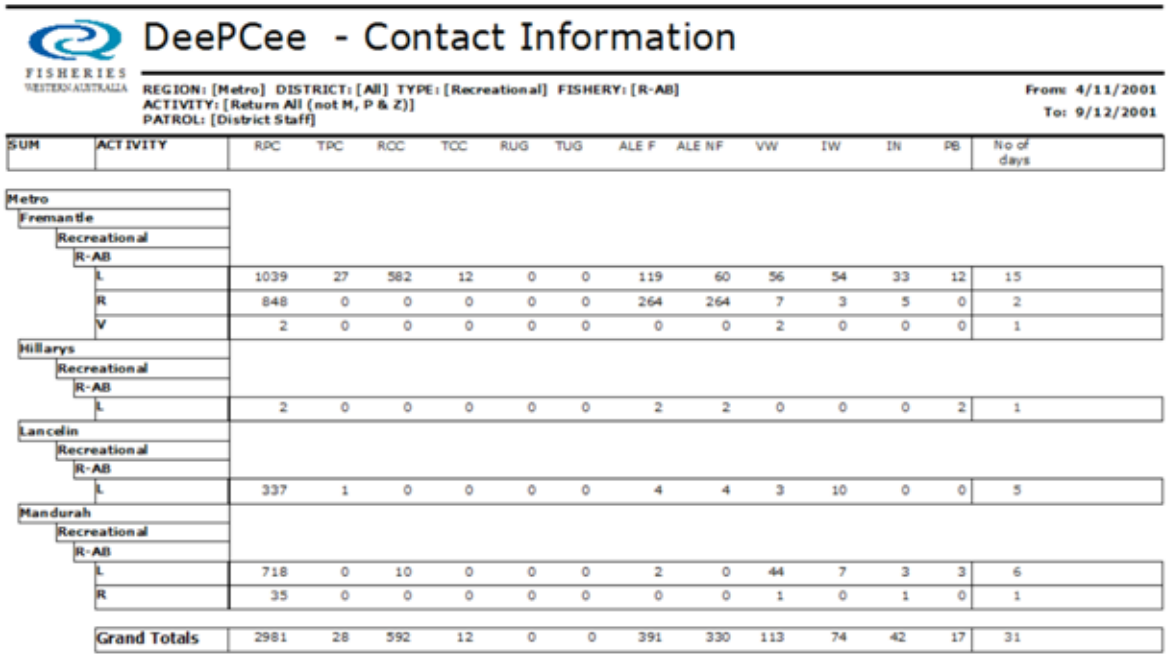


Figure 13. Report selection for compliance contacts by district-based staff in the recreational abalone fishery in the Perth Metropolitan Region, returning all Districts, occurring during the period 4/11/2001 to 9/12/2001.



DeePCee - Contact Information

FISHERIES WESTERN AUSTRALIA

REGION: [Metro] DISTRICT: [All] TYPE: [Recreational] FISHERY: [R-AB]
ACTIVITY: [Return All (not M, P & Z)]
PATROL: [District Staff]

From: 4/11/2001
To: 9/12/2001

SUM	ACTIVITY	RPC	TPC	RCC	TCC	RUG	TUG	ALE F	ALE NF	VW	IW	IN	PB	No of days
Metro														
Fremantle														
Recreational														
R-AB														
	L	1039	27	582	12	0	0	119	60	56	54	33	12	15
	R	848	0	0	0	0	0	264	264	7	3	5	0	2
	V	2	0	0	0	0	0	0	0	2	0	0	0	1
Hillarys														
Recreational														
R-AB														
	L	2	0	0	0	0	0	2	2	0	0	0	2	1
Lancelin														
Recreational														
R-AB														
	L	337	1	0	0	0	0	4	4	3	10	0	0	5
Mandurah														
Recreational														
R-AB														
	L	718	0	10	0	0	0	2	0	44	7	3	3	6
	R	35	0	0	0	0	0	0	0	1	0	1	0	1
	Grand Totals	2981	28	592	12	0	0	391	330	113	74	42	17	31

Figure 14. Report results for compliance contacts by district-based staff in the recreational abalone fishery in the Perth Metropolitan Region, returning all Districts, occurring during the period 15/11/2001 to 30/06/2002.

In this report, data for all Districts are returned separately. Most inspection activity occurs in the Fremantle and Mandurah Districts, reflecting the high participation rate in the fishery in these population centres. The low count of unique days of work conducted in these compliance activities is indicative of the short open season (six days). Roadside checks of 35 vehicles in the Mandurah district resulted in one verbal warning (VW) and one infringement notice (IN).

7.7 Commercial Information Report

The commercial check report is used to display summaries of the commercial check information recorded on the lower section of the DPC form. Subsetting for different aggregations of the data occurs in a fashion similar to that described for the contact information reports, with the exception that recreational information is not available. It is again instructive to consider an example, this time all commercial check information performed in the Esperance District for all fisheries and all activities during the 2001/2002 financial year (Figure 15 and Figure 16).

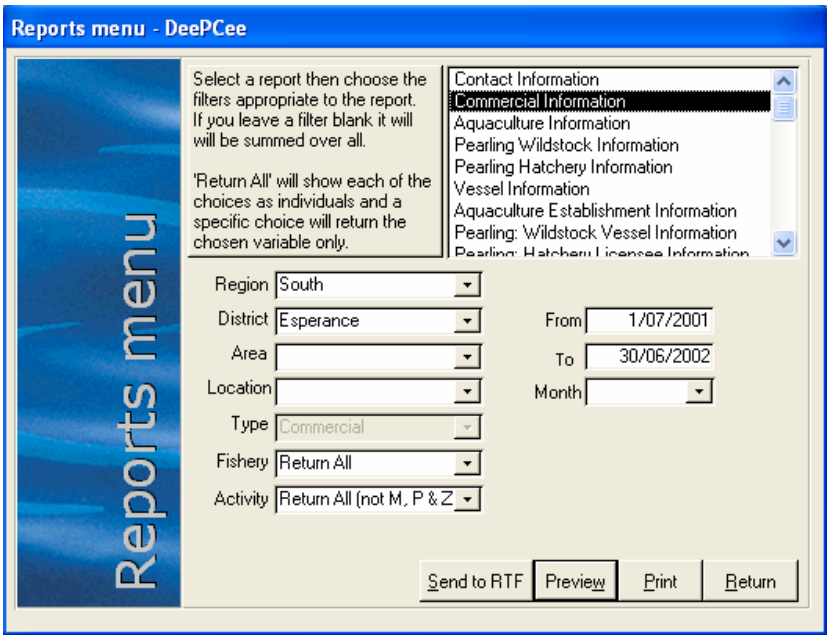


Figure 15. Report selection for all commercial compliance inspections in all commercial fisheries in the Esperance District occurring during the period 01/07/2001 to 30/06/2002.

FISHERIES WESTERN AUSTRALIA

DeePCee - Commercial Information

REGION: South - DISTRICT: Esperance - FISHERY: All
ACTIVITY: All (except M, P & Z)

From: 1/07/2001
To:30/06/2002

Sub-sets		Unique vessels	Liason only	Covert	No of people	CFL Skip	CFL Crew	MFL	FBL	Formal	Informal	Supp	No of Pots	Gear check	Board at sea	Insp of catch	Boat search	QMS	Other	Infringements VW	IW	IN	PB
South																							
Esperance																							
AB03																							
	L	11	17	10	55	2	3	1	0	0	0	0	0	0	0	25	3	1	0	1	0	0	1
	R	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0
AB04																							
	L	4	2	3	4	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0
SCE																							
	L	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
SCPS																							
	L	6	2	0	11	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
SDL																							
	L	11	7	3	7	1	1	0	0	0	0	0	0	5	0	11	0	0	0	1	0	0	0
	S	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
SH02																							
	L	18	15	1	39	10	9	6	6	0	0	0	200	11	0	1	0	0	0	1	0	0	0
	V	1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Totals		54	43	17	118	15	16	10	8	0	0	0	200	19	0	44	4	1	0	3	0	0	1

Figure 16. Report results for all commercial compliance inspections in all commercial fisheries in the Esperance District occurring during the period 01/07/2001 to 30/06/2002.

Results show 54 vessels from six commercial fisheries were inspected during the period. Most contacts resulted from land-based patrols (L), but commercial fishers were also inspected at roadside checkpoints (R), from work conducted from Departmental small vessel (V), and while traveling to sea aboard a commercial vessel (S). The only prosecution brief to be raised arose from an inspection in the Greenlip and Brownlip Abalone Fishery (AB03).

7.8 Vessel Information Report

This report is perhaps the most useful for field-based Fisheries Officers since it provides specific details relating to checks of individual vessels. As a final example, consider individual inspection information from commercial checks in Exmouth Gulf Prawn Fishery (Figure 17 and Figure 18). Note that some information is necessarily suppressed for reasons of confidentiality.

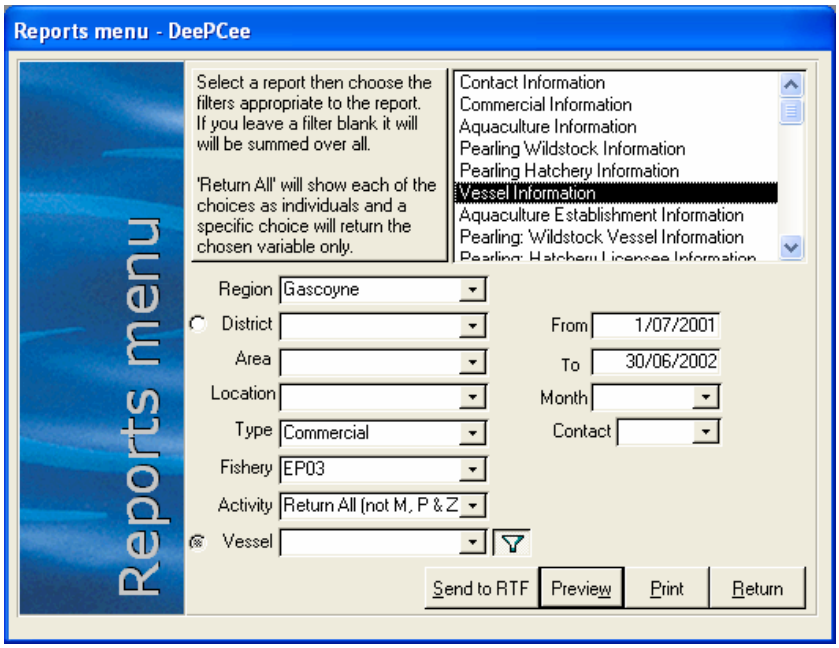


Figure 17. Report selection for all commercial vessel inspections in the Exmouth Gulf Prawn Fishery in the Gascoyne Region occurring during the period 01/07/2001 to 30/06/2002.

FISHERIES WESTERN AUSTRALIA

DeePCee - Vessel Information

REGION: Gascoyne - TYPE: Commercial - VESSEL: All - FISHERY: EP03 From: 1/07/2001
ACTIVITY: All (except M, P & Z) To:30/06/2002

Sub-Sets	Date	Officer	Area	Location	Time Arrive	Time Depart	Fishery	Activity	Contact type
	Liason Covert	No of people	CFL Skip Crew MFL FBL	Form Inform No of Pots	Other Gear Board at sea	Insp of catch Boat search QMS Other		VW IW	IN PB
Gascoyne									
Exmouth									
Vessel Nbr									
DPC /2001		Officer XYZ	EXG	Exmouth Marina	AM	AM	EP03	L	Random
No	0	0	0 0 0 0	0 0 0	1 0	0 0 0		0 0	0 0
DPC /2001		Officer XYZ	EXG	Location Missing	PM	PM	EP03	V	Random
No	1	0	0 0 0 0	0 0 0	0 0	0 0 0		0 0	0 0
DPC /2001		Officer XYZ	EXG	Marina	AM	AM	EP03	L	Random
No	0	0	0 0 0 0	0 0 0	0 0	1 0 0		0 0	0 0
DPC /2001		Officer XYZ	EXG	Marina	AM	AM	EP03	L	Random
No	0	0	0 0 0 0	0 0 0	0 0	1 0 0		0 0	0 0
DPC /2002		Officer XYZ	EXG	Western Gulf	PM	PM	EP03	V	Random
No	1	1	0 0 0 0	0 0 0	0 0	0 0 0		0 0	0 0
DPC /2002		Officer XYZ	EXG	Marina	AM	AM	EP03	L	Random
No	0	2	0 0 0 0	0 0 0	0 0	1 0 0		0 0	0 0
DPC /2002		Officer XYZ	EXG	Marina	AM	AM	EP03	L	Random
No	0	0	0 0 0 0	0 0 0	1 0	0 0 0		0 0	0 0

Figure 18. Report results showing commercial vessel inspections in the Exmouth Gulf Prawn Fishery in the Gascoyne Region occurring during the period 01/07/2001 to 30/06/2002. Vessel numbers, DPC reference numbers, dates and times, and names of attending Fisheries Officers have been removed for reasons of confidentiality.

Due to the level of detail provided this report is somewhat less intuitive than others presented. Each contact is shown as two lines of information which can be interpreted by the two lines of column headings. Levels of detail that might be used to identify individual fishers, Fisheries Officers, or inspections have been suppressed. Results presented are for a single vessel only and have been subset from a much larger report containing many more vessels (Figure 18). This shows that the vessel presented was contacted seven times during 2001/2002, with two of these being covert observations. All contacts were random. Three catch inspection and two gear inspections were carried out.

The user reporting system within DeePCee is an excellent way to allow District staff to access compliance data, however, because it relies on standard reports, it is relatively inflexible. Additionally, MS Access reports lack an easy way to 'drill-down' or 'roll-up' data meaning that sometimes many individual reports must be run to generate the information required.

Once built, maintaining a comprehensive set of such reports becomes time-consuming because relatively minor changes to the database can mean that reports fail to run, or worse, display incorrect data. In our case, the changing business responsibilities of the Department have resulted in similarly changing reporting needs. It has simply not been possible to ensure that the customised suite of reports is maintained to the standard needed for users to be confident in them, consequently use of the user reporting system has decreased. Instead users contact the database manager who undertakes a specialised data extraction. Future development of the reporting capability of DeePCee is discussed further elsewhere in this report (see section 9).

7.9 Specialised data extraction: SLED Compliance 06/07

The DeePCee database supports 'administrator' levels of access directly to the back-end data tables of the database system, allowing customised queries can be written to extract any type of information that has been submitted to the database. In the experience of this author (TJG), specialised data extractions have formed the basis for the majority of the use of the database. The reason for this is simply that it takes considerable time for a software expert to build a detailed report, this time is repaid if that report is run often but for unusual, ad-hoc data requests that are run only very occasionally, it makes more sense to set-up an expert user capability that can query the database directly.

In the 26-month period from November 2005 to the time of writing (January 2008) there have been in excess of 150 specialised data extracts performed, equating to about 6 per month. It is estimated that current use levels of the reporting interface centrally available on the Department's network and described earlier would be at most 2-4 times per month on average – although this is partly due to a lack of suitable reports being available. The ability to undertake specialised data extracts is clearly a great asset for this system and it is worth noting that this flexible functionality is typically not available from a commercial, off-the-shelf reporting system.

An example of the specialised data extraction possible from DeePCee is given here. A requirement of the Regional Services Branch was to report on the levels of Sea-Lion Exclusion Device (SLED) compliance after the devices were introduced for the 2006/07 West Coast Rock Lobster season, in an attempt to remove sea-lion by-catch in the fishery. Stakeholders saw non-compliance with the SLED regulations by commercial and recreational fishers as a major risk, having the potential to significantly lessen the impact of introducing such devices. Most at-sea inspections of commercial pots are undertaken by the Department's three large patrol vessels, which were already equipped with PVDB, so the opportunity was taken to modify the

database to allow information to be collected on SLED compliance status when the vessels were inspecting pots. A map of the results is shown in Figure 19.

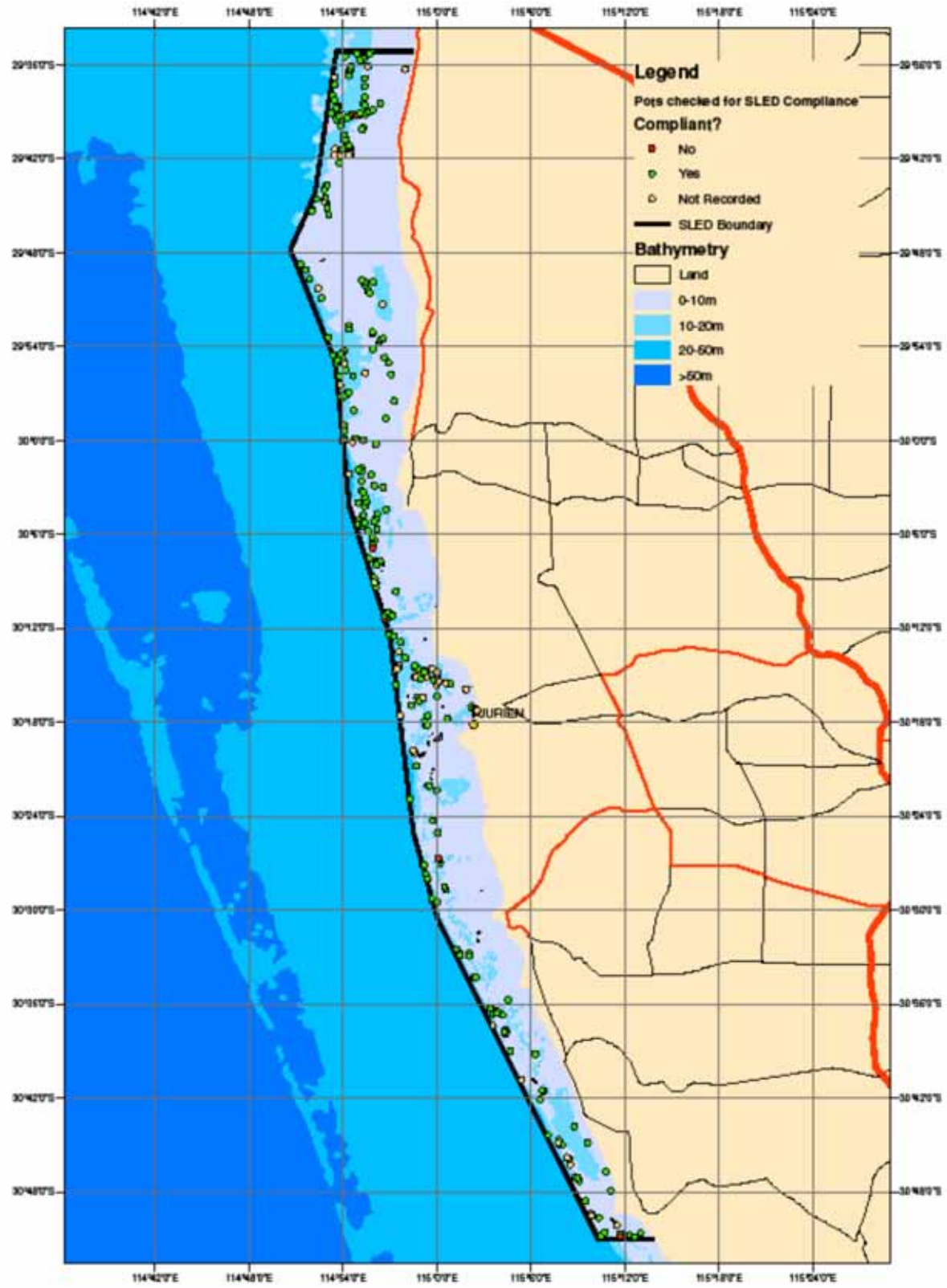


Figure 19. The result of collation of SLED inspection data from pot checks undertaken by the Department's 3 large patrol vessels over the 06/07 WCRL season. All pot inspection data was extracted from PVDB with a simple query, which was imported into ArcView. A shapefile defining the SLED boundary was then used to select those inspections that occurred within the SLED inspection area.

The spatial extent of the pot inspections can clearly be seen in Figure 19, as can the fact that the majority of pots inspected were compliant. It is also apparent from the figure that the majority of inspections were conducted offshore, although the general spatial extent of pots checked shows a fairly even distribution over the length of the SLED area.

Table 3 details the numerical breakdown of SLED inspections and reveals the importance of user training when recording data in an electronic system. Unfortunately PVDB was modified hastily to meet the start of the fishing season and the skippers were not required to explicitly state the SLED status upon entering the details of a pot check. Since recording of the SLED status is only one minor component of the check, it transpired that in ~20% of cases, the status of the SLED was not recorded in the database. For this reason, the SLED Compliance Rate for each sector is given for 3 scenarios – where the SLED's with unknown compliance status are excluded completely, where they are all assumed to be compliant, and where they are all assumed to be non-compliant.

Table 3. Numerical summary of SLED compliance data by fishing sector (break down of the data shown graphically in Figure 19).

Sector	N Pots Examined	% SLED Status not recorded	Compliance Rate		
			Excl. not recorded	Worst Case	Best Case
REC	19	42.1%	100.0%	57.9%	100.0%
COM	559	20.8%	96.8%	76.7%	97.5%

The first scenario (excl. not recorded) in Table 3 represents a valid estimate of the non-compliance rate, if the high missing data rate (21.4% for the entire sample) is deemed to be acceptable. The worst case and best case (from a fishery compliance viewpoint) represent reasonable upper and lower limits, although it is worth considering the fact that non-compliance with SLED requirements is a serious matter and it is likely that any instances of non-compliance would have been recorded by the skippers. That argument would suggest that the best-case scenario, the compliance rate being greater than 97.5% overall, would be a realistic estimate.

The database has now been modified to make recording SLED status easier when undertaking compliance checks and the skippers provided with training material which should dramatically reduce the number of inspections for which the SLED status is not recorded.

Finally it should be noted that the patrol vessels have historically tended to concentrate on cost-recovered commercial inspections, which are harder to undertake using District resources, and this resulted in relatively few recreational pots being inspected. Review of the data shown in Table 3 will result in better targeting of recreational fishers in inshore waters for the 07/08 season.

7.10 Trend data – maximising the usefulness of DeePCee (Objective 1) (TJG)

It has been argued elsewhere in this report that trend data can overcome some of the limitations of reporting systems. This is based on the assumption that providing any inherent systematic errors remain constant over the time period, any detected changes will still be real. For example a quantitative linear measurement technique that suffers from sampling losses may only measure ~75 % of the actual ambient quantity being measured. If it is not possible to quantify exactly how much is lost in the sampling process, but one is confident that the losses are constant over time, meaningful changes can still be detected, and with much greater precision than the accuracy of a single measurement would suggest was possible. The same rationale can be applied to the data reporting systems detailed in this project. The complexity of the business rules means that doubt can sometimes be cast on the actual magnitude of the number of contacts recorded on any one patrol – especially in a fishery such as abalone when many contacts are made in a short period (typically ~ 60 per hour). However, providing that the way patrols are conducted remains the same over successive seasons, it should be possible to discern trends in compliance rates using the data.

The data presented in this case study utilises DeePCee data, offences data and recreational effort data to show how, by combining data from different, completely independent sources results in a useful overall picture that could not be obtained from any other source. The data presented here is "crude" in that it does not distinguish between random and targeted contacts and offences. Although the DPC collection system does collect this information, it still has yet to be structured in a way that allows a "true" non-compliance rate to be calculated easily. This issue is discussed further in section 9, and an example of the use of the random and targeted classification of contacts and offences is used later in this section to illustrate how DeePCee data will ultimately allow non-compliance rates for any fishery of interest (or area of interest) to be derived, providing a comparative metric that allows compliance resources to be directed to the areas and fisheries that are in greatest need. Such estimates have great utility all through the chain of fisheries management, representing a Key Performance Indicator, which is simple to comprehend, and which can trigger action should critical thresholds be crossed.

7.11 The North Metropolitan Recreational Abalone Fishery – A case study

The North Metropolitan Recreational Abalone Fishery in Perth is a convenient subset of the state recreational abalone fishery. Although the recreational fishery is split into two management zones, metropolitan and regional, the bulk of the metropolitan effort occurs north of the Swan River mouth where Roe's abalone are abundant and easy for recreational fishers to access from reef tops or with snorkelling gear. The north metropolitan area of Perth is highly populated and abalone highly sought after, resulting in strict daily bag and size limits and a very short open season (6 hours across six consecutive Sundays in November and December). It has long been recognised that high levels of compliance effort are required to ensure that fishers understand and adhere to the rules governing the fishery. There are always a relatively large number of minor offences each year, but research data indicates that the fishery is resilient enough under the current management framework, to withstand the historic level of non-compliance.

The significant compliance effort required to police the abalone season has implications for compliance in other fisheries. During the abalone open season, large numbers of officers are

diverted from their routine patrol duties and assist with abalone compliance. The large number of offences detected poses an administrative burden that can continue to prevent officers actively patrolling for at least one month after the end of the season. Knowing how historic levels of non-compliance compare to stock assessment levels and management changes would be helpful in assessing whether any compliance assets could be relinquished from abalone compliance and made available to other fisheries. The problem has always been in determining a non-compliance rate. The DPC data collection system was established just for this purpose and DeePCee data from it has been used for the first time to estimate historic non-compliance rates in the fishery.

$$\text{Crude Non-Compliance Rate} = \frac{\text{Number of Offences}}{\text{Number of Contacts}}$$

This form of the non-compliance rate is termed "crude" since it does not account for targeted inspections that should result in higher offence rates. This is analogous to the calculation of crude birth rates which are calculated as the number of births expressed per head of population, as opposed to age-specific rates which account for the fact that only women can have babies, and that fertility is age-related, by using the number of females of a certain age-group as the denominator. Unfortunately, determining which offences were the result of targeted inspections is non-trivial in Western Australia (see Section 9) because the offences database is a stand-alone entity, distinct from DeePCee, so for the purposes of this preliminary example, the crude non-compliance rate will have to suffice.

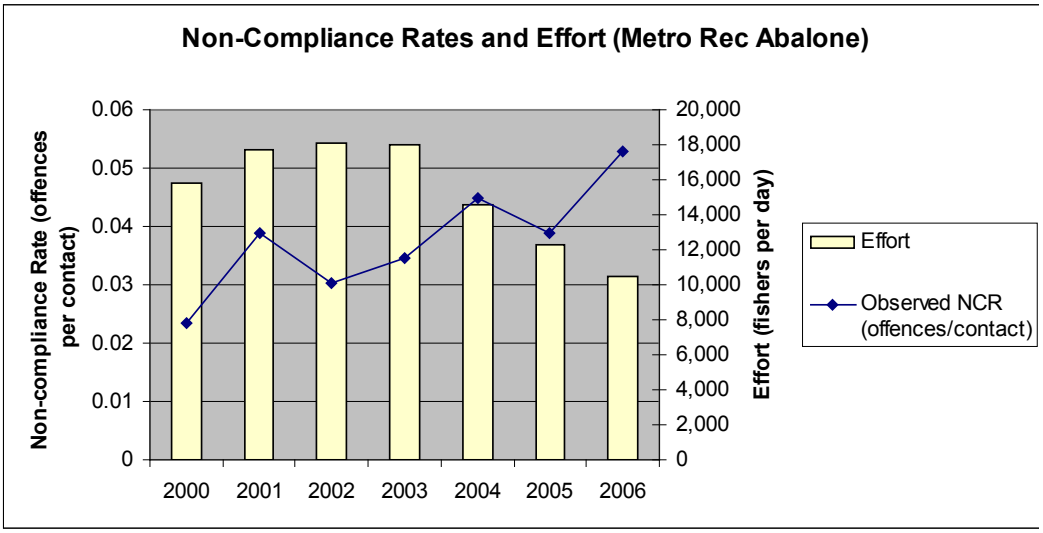


Figure 20. The crude non-compliance rate by year (abalone season) and the recreational fishing effort (fisher days) for the north Perth metropolitan recreational abalone fishery.

It can be seen from Figure 20 that the non-compliance rate in the North Metropolitan Recreational Abalone Fishery has steadily risen from ~0.025 offences per contact in 2000 to ~0.055 offences per contact in 2006. Over the same time period, recreational effort has decreased considerably (from a maximum peak in 2002). The detected non-compliance rate can be combined with the total number of detected offences to calculate an estimate of the total number of offences in the fishery (ensuring appropriate units are used):

$$\text{Total Fishey Offences} = \text{No. of Detected Offences} \times \frac{\text{Total Fishery Effort}}{\text{No. of Random Contacts}}$$

The results of this extrapolation (Figure 21) shows that the total number of offences in the fishery has actually remained fairly constant at ~ 550-650 offences per year since 2001 (albeit with a large degree of fluctuation from year to year), and possibly even fallen by a small amount in recent years.

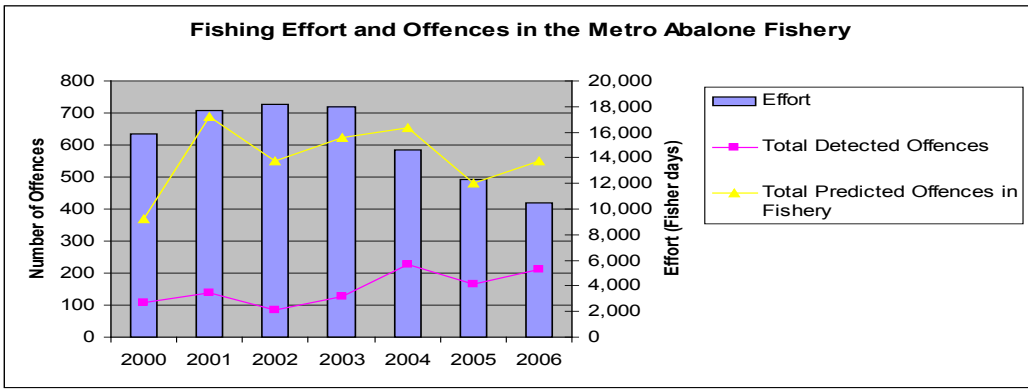


Figure 21. Fishing Effort and Offences in the North Metropolitan Recreational Abalone Fishery.

The results from this analysis suggest two interesting conclusions:

1. Non-compliance within the fishery is increasing, potentially demanding greater compliance assets to lower it.
2. Overall, the number of offences within the fishery is stable, or possibly even decreasing, resulting in less stock lost from the fishery through illegal fishing.

There are at least three refinements that should be made to the analysis before significant changes were made to the delivery of compliance or the management of the fishery:

- Targeted inspections and any resulting offences needs to be removed and reported separately from the analysis so that a random sample is used
- Any potentially confounding factors such as significantly changing patrol patterns or mismatched spatial boundaries would need to be considered.
- The fishing effort in this fishery is particularly dependent on weather, tides and swell, which could affect the observed results.

However, if those factors are considered and do not change the preliminary findings made here, it does suggest the possibility that compliance resources could be freed up during future abalone seasons. Such an approach would involve some risk, but could be undertaken with a degree of confidence given that the reporting frameworks described can be used to closely monitor the results of any such reduction in compliance coverage. If abalone stock levels are not felt to be sufficiently robust to cope with potentially increased illegal take, the converse approach could be taken: where compliance resources are significantly increased. If there were no corresponding decrease in the non-compliance rate it would indicate that the non-compliance rate is not particularly sensitive to the level of compliance resources and alternative means of explaining the variation in non-compliance rates should be sought.

A linear regression of the amount of time fisheries officers spent actively patrolling the fishery against the non-compliance rate suggested a weak positive correlation ($R^2 = 0.4$), although this may strengthen if targeted checks are taken into consideration.

Finally, it should be noted that the spatial nature of the DeePCee database would allow compliance practitioners to investigate whether the increased non-compliance rate is observed across all three DPC areas that comprise the fishery, or whether there are any particular problem areas.

7.12 Crude Recreational Non-Compliance Rates for Western Australia

The approach taken in the previous example can easily be taken for other specific fisheries and or areas, or for the entire state. The crude recreational non-compliance rate for WA has been calculated using DeePCee data and offence data (Figure 22).

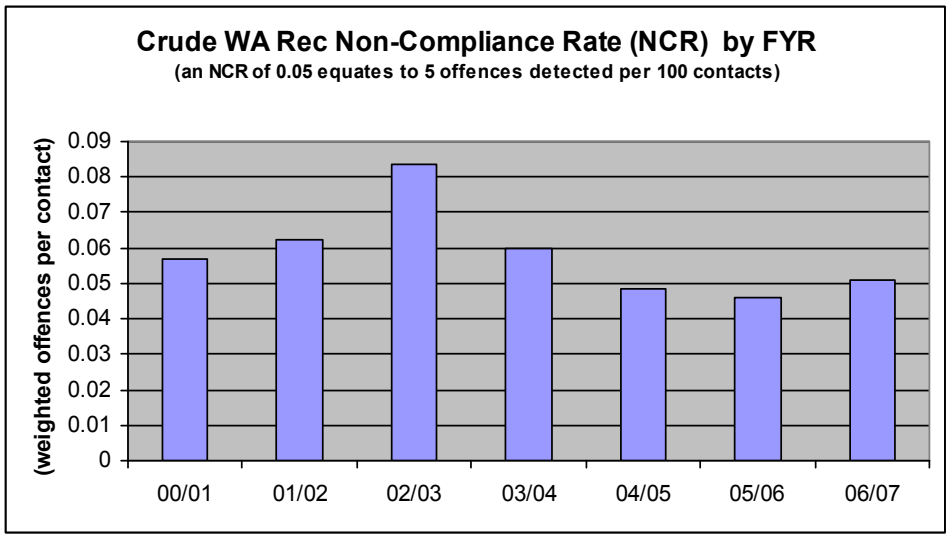


Figure 22. The crude non-compliance rate by financial year for the recreational fishing sector in Western Australia.

A slightly different approach has been taken in calculating the crude non-compliance rate for Figure 22. The number of offences is weighted for the purposes of this analysis on the grounds that a prosecution brief is a more significant offence than an infringement notice which is in turn more significant than an infringement warning. The weighting factors 3,2 and 1 were used for the respective offence types. Ideally non-compliance rates would be expressed as a quantity of illegal stock per contact which would have direct relevance to stock assessment models, but the WA offence database does not consistently characterise the amount of illegal stock involved in each offence. In some cases the offences are gear related so that stock is not directly involved. Since the guidelines for proceeding with an offence are developed as part of a risk assessment process for an individual fishery, the weighting process used here takes some account of that process although the weighting factors are purely arbitrary at this stage.

It can be seen from Figure 22 that the crude non-compliance rate has remained fairly stable for the past three years at around 0.05 (weighted) offences per contact. The peak of 0.085 offences per contact in the 02/03 financial year is a notable feature of the dataset. Figure 23 shows the total number of contacts and the weighted offences over the same time period. The number of contacts rose from ~40,000 per year in the two years 01/02 and 02/03 to ~50-60,000

contacts per year for the successive years. This rise in recreational contacts is a result of the increased number of FMOs available for compliance patrols after the Department took on the responsibility for delivery of Marine Safety in the Metropolitan area from July 2003. Similarly, the decline in recreational contact numbers over the last 3 financial years reflects decreasing FMO numbers as the Department has struggled to maintain full FMO staffing levels in the face of competition from other sectors of the WA economy where marine skills in particular are very highly valued.

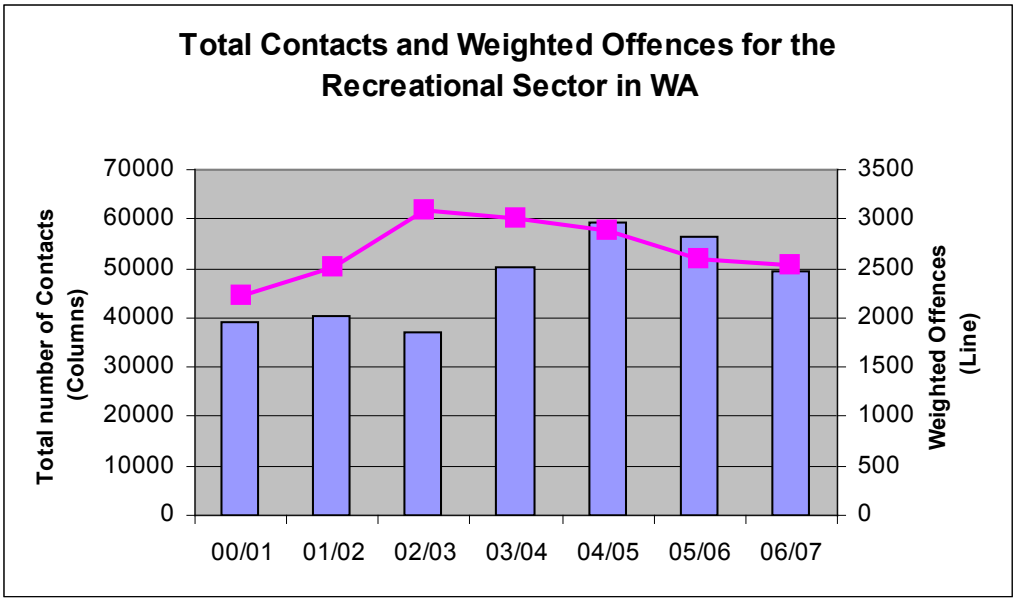


Figure 23. Total Contacts and Weighted Offences for the Recreational Sector in Western Australia.

The peak in the non-compliance rate for 02/03 could therefore be argued to be a result of a minimum in contact levels combined with a maximum in offences and is probably reflective of the complex nature of compliance whereby you need active officers to detect offences, but increased officer presence all provides a deterrent value meaning that eventually sufficient officers result in decreasing offence rates. Further work is needed to combine relevant data, such as FMO numbers, active patrol hours etc, before more interpretation can take place. In particular, the confounding effect of targeted inspections should be accounted for.

7.13 Consignment of Oversize Female Western Rock Lobster

Risk Assessments of the West Coast Rock Lobster Fishery have revealed that in poor seasons (such as the 06/07 season) some commercial fishers attempt to consign a significant amount of oversize female West Coast Rock Lobster to increase the weight of their consignments. Fishers are paid by the weight of consigned catch, not the number of animals, and as these are generally big, heavy animals they have a large effect on a consignment weight. The DeePCee database was used to check whether data supports this hypothesis with a view to possibly amending the Prosecution Policy Guidelines to increase the severity of action following detection of this offence.

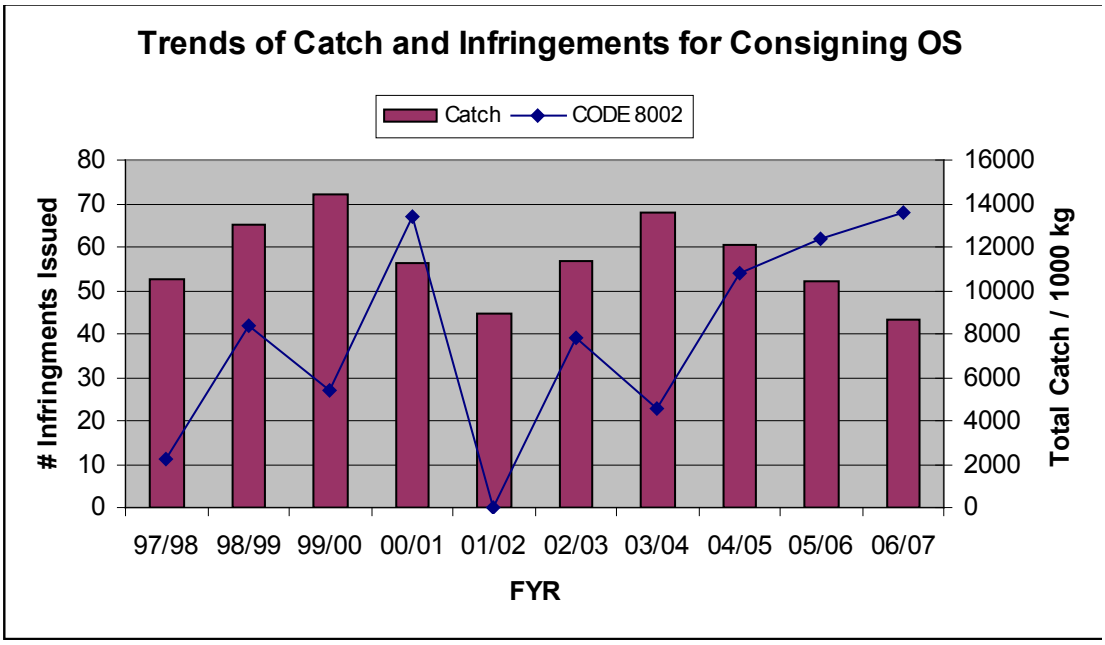


Figure 24. Time history of catch and number of infringements issued for over size (OS) female West Coast Rock Lobster (Code 8002 is the infringement code used in the offences data collection for this type of offence)

Figure 24 supports the hypothesis that the number of OS females in consignments has increased in recent seasons, the upward trend in the number of illegal OS animals being negatively correlated with the decreasing total catch.

The ratio of the number of oversize animals detected to the number of baskets inspected was determined to smooth out years that compliance officers undertook more inspections. The data was also classified according to whether inspections were random or targeted to avoid skewing the data. This is easy to do for the Factory Inspection data collection in DeePCee because the type of action taken as a result of an offence is recorded on the same form that is used to capture the details of the inspections undertaken, which means that the offences data collection is not required. As stated earlier, work is still underway to classify all offences according to whether they resulted from random or targeted inspections (see section 9 for further details of this process). Figure 25 graphically displays these results, together with the total reported catch for the fishery.

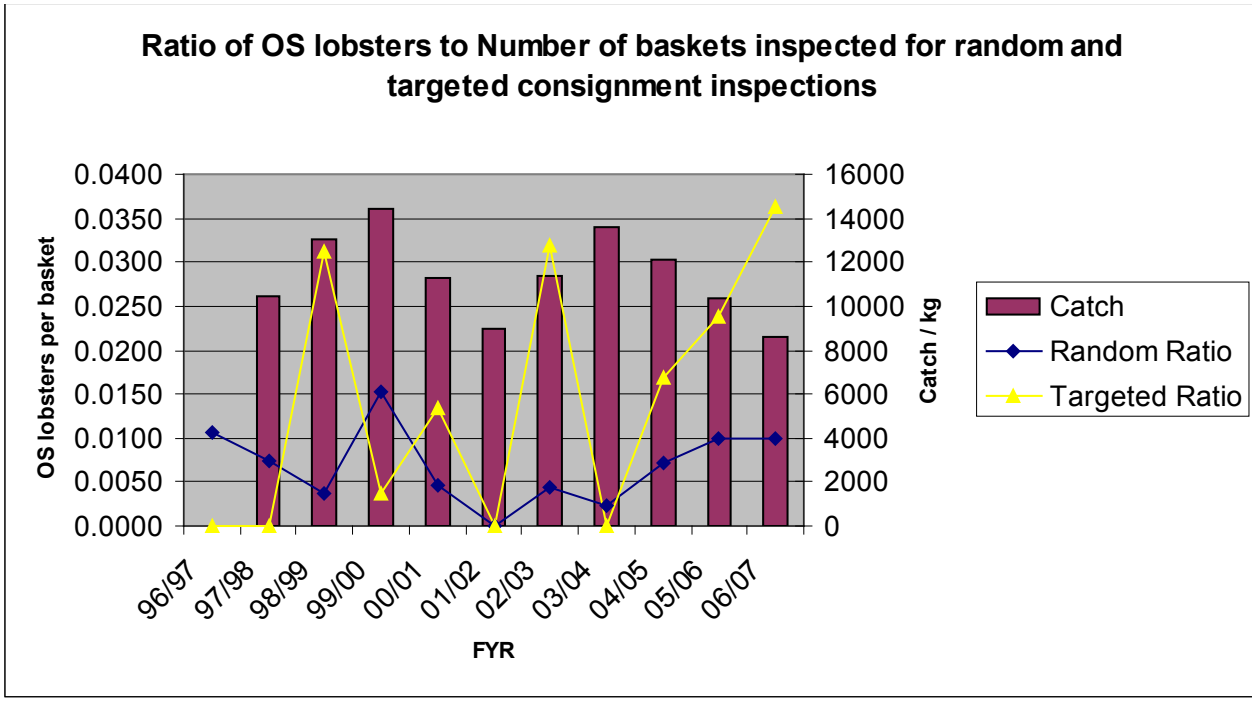


Figure 25. Detection rates for oversize (OS) females from random and targeted inspections (note: taking oversize females (non-setose) was permitted for the 01/02 season).

A ratio of 0.025 in Figure 25 means that one OS lobster was detected in every 40 baskets that were inspected. Only a fraction of the total consigned catch is ever inspected (typically ~ 3%), so the random ratio of consigned OS lobsters can now used to extrapolate a value of the oversize catch consigned for the entire fishery. The random OS consignment rate for 06/07 represents 2873 OS lobsters consigned for the entire fishery (assuming an average of 30 lobsters consigned per basket).

The random consignment rate of OS animals in 06/07 was identical within rounding errors to the rate observed in 05/06, in spite of decreased catch in 06/07 (Figure 25). There is a good negative correlation between catch and infringements issued for OS for the years 98/99 onwards and excluding 01/02 (the oversize rule did not apply in this year) ($R^2 = 0.7$). The ratio of OS in consignments has risen disproportionately in targeted inspections in recent seasons compared to the ratio in random inspections (Figure 25), perhaps indicating improved target selection. The ratio of oversize in targeted inspections in 06/07 was the highest yet detected (0.036 animals per basket).

Since the trend in OS consignments does appear to be closely linked to the total catch, compliance staff can use catch predictions for future seasons to help plan the level of compliance focus and intelligence driven targeting for fishers deemed to be at risk of consigning OS. This is an excellent example of how the data captured by the systems setup through this project can drive operational compliance, if it is presented in a suitable and timely format for compliance managers.

Also of interest to those managing compliance assets is knowing which Districts have the highest rates of consigned OS, Table 4 shows the raw numbers, while Figure 26 displays the ratio graphically.

Table 4. Raw number of baskets inspected and oversize (OS) animals detected in those consignments by District:

District	Data	Fyr				
		02/03	03/04	04/05	05/06	06/07
Dongara	Baskets	1086	1265	1103	726	405
	# Oversize	5	0	1	1	0
Fremantle	Baskets	5292	8155	7076	6909	5016
	# Oversize	29	13	57	90	72
Geraldton	Baskets	2534	4115	3133	2173	3266
	# Oversize	25	22	11	13	39
Hillarys	Baskets	114	1067	93	25	43
	# Oversize	1	0	0	0	0
Jurien	Baskets	736	351	347	574	184
	# Oversize	1	0	0	3	1
Lancelin	Baskets	653	700	1192	573	33
	# Oversize	0	1	29	13	0
Mandurah	Baskets	551			178	
	# Oversize	0			0	
Total Baskets		10966	15653	12944	11158	8947
Total # Oversize		61	36	98	120	112

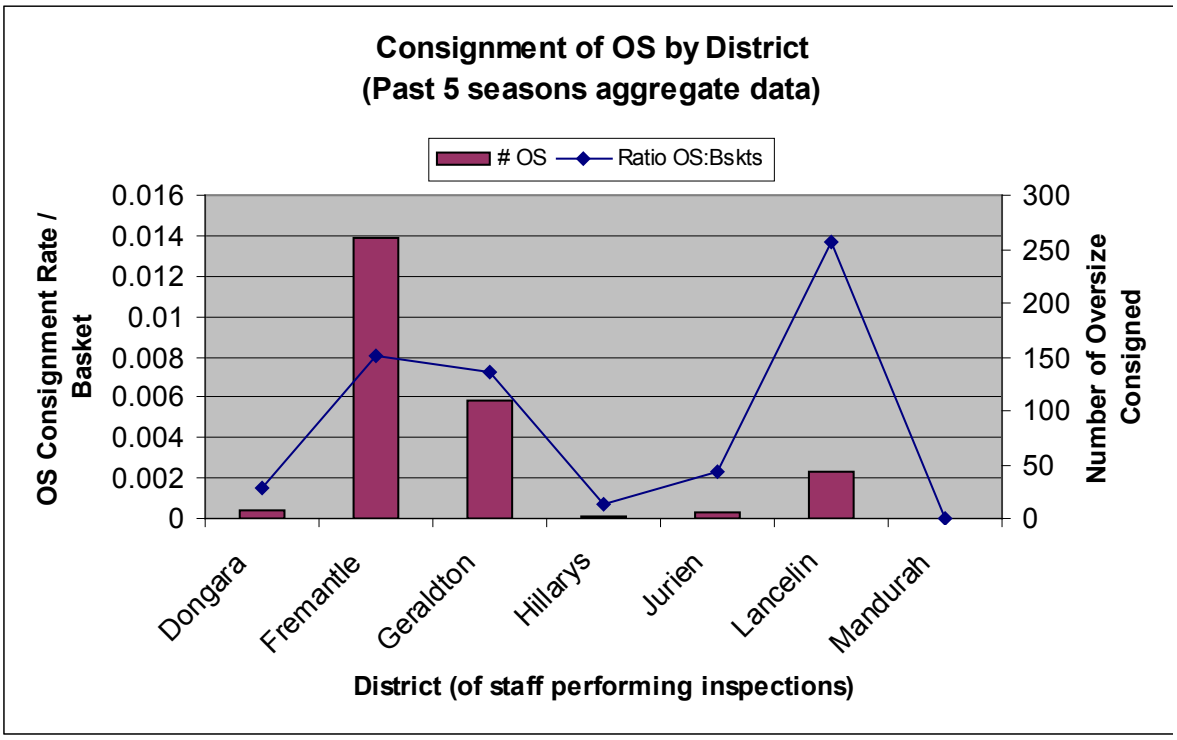


Figure 26. Consignment rates of oversize (OS) females by District for the past 5 seasons aggregated.

Figure 26 indicates that consignments processed in the Lancelin district present the highest risk for fishers consigning OS. Fremantle and Geraldton also have elevated rates, and significantly more inspections. Consequently, some thought should probably be given to increasing the

number of inspections for OS in Lancelin, although that will need to be assessed using knowledge of which establishments those inspections took place in and the fishers that were involved – data that are available to compliance officers through the DeePCee reporting system.

DeePCee data shown here clearly demonstrates that consignment of OS females in the West Coast Rock Lobster Fishery increases when catch rates decline. The elevated levels of consigned OS for the past 2 seasons represent the highest rates seen since 99/00. The 06/07 season also saw a large increase in the rate of OS consignments in targeted inspections (all types of targeting) and this suggests that target selection procedures used by compliance staff in the fishery are working well.

It seems likely given that poor catches are predicted for future seasons, consignment of OS will continue at similar rates and so serious consideration should be given to amending the prosecution policy guidelines in attempt to deter potential offenders. The quantitative data on the number of OS females will also be passed on to research staff to ascertain whether likely future levels of consigned illegal animals present any threats to the total breeding stock.

7.14 VFLO data (Objective 4) (TJG)

Western Australia has ~ 110 Fisheries and Marine Officers undertaking compliance, while there are also a further ~ 150 Volunteer Fisheries Liaison Officers (VFLO's) spread across the State. Traditionally, the VFLO role has had close ties with compliance work: They are district based and so have regular contact with District FMOs, they are regularly making contact with fishers, either when actively fishing, or while undertaking education programs in a community setting. The VFLO affiliation to the Department makes them an ideal conduit for channelling information to fishers, but also returning information, formally and informally, back to the Department.

From the inception of this project, it was hoped that VFLO's could be used to report compliance information resulting from their patrols and contacts. This has not occurred for two principal reasons:

7.14.1 The complexity of the reporting systems

As will be apparent from the work detailed here, and the current DeePCee manual issued to FMOs (see Appendix 5 – The DeePCee Manual v2.4 (on CD)), there is a considerable responsibility placed on FMOs when they are reporting details of their compliance activities. Although some FMOs embraced the reporting system because they saw the utility of it in assisting them with their work, it would be fair to say that the majority use the system because they are told to, rather than because they see the value in it. FMOs are highly trained specialists, used to understanding and applying complex fisheries legislation, yet even they have struggled to complete the forms according to the stated business rules of the database. This has caused problems within the work unit processing the forms, since validation and follow-up of possible mistakes and uncertainties is time-consuming and tedious. It has also caused problems with the FMOs, who naturally do not like making mistakes.

As the system matured it was increasingly clear that rolling it out to VFLO's would be unadvisable. Being volunteers, freely giving of their time, it was felt that it would be unrealistic to require the same high reporting standards that FMOs are subject to. There is also a limit to

the onerous reporting requirements the Department can expect a volunteer to shoulder happily. In fact, when Marine Park compliance became a joint responsibility between the Department of Fisheries and the Department of Conservation and Land Management (now Department of Environment and Conservation, DEC), it was felt that even paid officers from other agencies could not be expected to use the system because they were unlikely to undertake the rigorous reporting requirements diligently enough in an area that was largely unfamiliar to them (fisheries compliance).

7.14.2 The role of VFLO's

In recent years the role of VFLO's has changed, instead of being akin to FMOs and undertaking patrols to identify illegal activity and provide deterrent value, they have increasingly taken on an educative role, delivering seminars and clinics in a semi-formal and structured environment. This education still fulfils an important role in the overall compliance arena – but it is not aligned with the core intentions of the DeePCee data collections: to estimate levels of illegal activity from classifying the types of contacts encountered during District patrols. VFLO contacts area akin to the "ALE" contacts also made by FMOs, who similarly undertake educative activities, but the utility of "ALE" contacts is more to give a semi-quantitative measure of the level of education being allocated to a fishery. It can be instructive to compare "ALE" contact rates with non-compliance rates, as doing so may draw attention to aspects of regulation that need further explanation or awareness, but "ALE" contact numbers alone are of lesser importance when isolated from compliance contacts. Arguably the principal reason for requiring FMOs to capture "ALE" contacts on the DPC form is to show why other types of contacts are not being made at a particular time, which again would not be relevant when monitoring VFLO performance.

While information regarding the number of patrols undertaken by VFLO's and the number of people they talked would undoubtedly be useful, because they are very rarely in a position to detect illegal activity, and lack the powers necessary to be sure that illegal activity has not occurred (eg to search a vessel), a VFLO contact would not represent a concrete chance of detecting illegal activity had it occurred. This premise is the basis of recording contacts on the DPC form. Information such as the number of contacts and the number of patrols can easily be captured by means other than DPC forms, although it is possible that in the future a simplified form for VFLO use may be rolled out. For the time being, other priorities have taken precedence, such as ensuring the data capture evolves with the business reporting needs, embedding the DeePCee system as a compliance tool within Regional Services Branch and developing useful reports that can easily be accessed in a timely fashion by both FMOs and senior managers.

8.0 Benefits and Adoption (TJG)

The benefits of the DeePCee system to the Department have been myriad:

- The Department now has a Statewide reporting system that consistently captures core information about patrols undertaken by FMOs.
- Spatial and temporal information about the level and nature of compliance services delivered to individual fisheries across WA is now available.
- Quantitative data about the level of collaborative patrols with other government agencies can now be obtained.
- Detailed inspection histories of individual commercial fishers can be extracted as required.
- Benchmarking of the level of services provided is now possible.
- Detailed data on commercial fishers is available to ensure that compliance is evenly distributed across all fishers.
- Information is available on the outcomes of targeted inspections that allow the effectiveness of targeting methodologies to be assessed.
- Electronic point of entry from PVDB integrates capture of compliance data with the workflow of performing compliance inspections.
- Photographs of vessels of interest are now available to PV crews if required during operational work.
- Commercial Marine Safety Inspections yield additional data that can be usefully incorporated into DeePCee.
- Recreational Marine Safety Inspections provide an opportunity to piggyback recreational fishing data collection.
- The modular nature of the in-house data collection reduces duplication between other departmental data systems (eg linking to offence data rather than duplicating it within DeePCee).
- The ownership of the in-house data systems allows easy and cheap modification as business needs develop and evolve.

To date, no other states or territories have adopted the methodology, it being used solely within WA. It is envisaged that other jurisdictions may take on the methodology once a dissemination process begins (see section 9). All active fisheries officers undertaking compliance in WA have adopted DeePCee, with the exception of the Serious Offences Unit. The nature of their work makes formal reporting through the system a potential security risk and unnecessary to calculate non-compliance rates because all their patrols are highly targeted.

Data has been used to support ministerial requests for additional resources, and to contextualise and guide policy decisions and implementation. The data has been used to demonstrate the accountability of the department when it comes to allocating compliance resources to particular fisheries. It is also used a cornerstone in undertaking spatial fishery compliance risk assessments. Finally, the data has been used in prosecutions, by both the prosecutor and defendant, who seek to view a particular offence in the context of the wider fishery.

9.0 Further Development (TJG)

The DeePCee data collections have been in a continuous state of development since the project began, but since the introduction of Marine Safety data collection around July 2004, the core systems have reached maturity and remained unchanged. The only exception to this would be the introduction of modifications to the system to allow marine park sanctuary zone compliance information to be collected. The importance of capturing patrol data from a large number of small areas that saw very few fishing contacts posed a particular challenge and it took approximately one year to come up with a robust system that would work across the State. While the development of a DPC form for Marine Park work is completed, there remains work to be done in making the data gathered on that form available via a central, self-serve portal. Currently the data has to be requested and supplied on demand via dedicated queries and secondary data analysis.

The DPC form and business rules and PVDB took divergent evolutionary paths. PVDB retains the ability to record a plethora of detail about inspections – a fact that hinders capture of the core features of compliance contacts. Further work is required to fully bring PVDB into the umbrella of DeePCee so that data recording using either system is readily available. For example, to have a full history check for a particular fishing boat requires two separate queries to be run, one from PVDB to capture any checks undertaken by the patrol boats, the other from DeePCee to capture details of checks done by district staff.

To date, no independent validation of the data reported using the systems described in this project has been undertaken. There is sufficient cross-referencing between systems to indicate that not all reporters consistently record information identically (eg when two officers on a patrol each inadvertently submit a DPC form for the same patrol). It would be interesting to define a number of scenarios to allow a selection of FMOs to each apply the business rules to the same basic information. As well as providing insights into the limitations of past data, it would allow identification of areas of inconsistency that required refinement and/or clarification for the future.

There is still a need for clear, simple, documentation of the business rules for the database. These must cover both how to submit data, and how to utilise the data for reporting purposes.

The potential contribution of new technology to the data systems described here will continue to be reviewed. It may be that technological advances in the future make a true real-time data capture device a possibility. In the meantime, development of an ‘in-car’ version of PVDB for the District Officers to use during patrols is something that will be actively considered.

The currency of data from these data systems has always been an issue. Electronic data entry is likely to remain incompatible with the delivery of operational compliance for some time. The data systems described here would be improved by changing from validation of forms prior to data-entry, to data-entry into a user-acceptance area followed by validation. This will reduce the lag time for reports, but will require work to ensure that the database handles pre-validated forms appropriately and that the amount of pre-validated data is clearly identified on any reports.

Finally, the data collections described in this project were built in MS Access, which in 2001 offered the flexibility and ease of use that the research project needed. However MS Access is not an ideal environment to house an enterprise database in 2008. Migration from MS Access to SQL (or similar) is urgently required and must also be accompanied by a major database rationalisation to escape the maintenance and development restrictions that legacy data structures impose on the workloads of those responsible for the system.

10.0 Planned Outcomes (TJG)

Ultimately the data collections that comprise DeePCee should provide estimates of non-compliance rates for all the principal fisheries within State waters. These rates would essentially act as KPI's for the delivery of compliance services to be evaluated against. When these non-compliance rates are placed into the context of stock assessments, greatly improved estimates of the level of illegal fishing become available. Currently the barriers to achieving this outcome have been twofold. IT issues have preventing data from the Access database store being disseminated centrally through the department's network via suitable reports. There has also been a shortage of analyst time available to reorganise the various data sets so that automated updating of the non-compliance rates can be accomplished regularly for all the fisheries that data is captured against.

Quarterly snapshot reports of compliance activity in each district should be readily available to officers in each District. The only barrier to this outcome is the lack of IT resources to build and deploy the report.

The spatial scales chosen for the area used in reporting on DPC forms are becoming embedded with Regional Services Branch. They form a convenient scale for reporting of aggregate data. Unfortunately they have been subject to varying degrees of change across each District and only rarely have they been explicitly mapped. The areas were established using written descriptions to define the boundaries. Mapping of the boundaries explicitly using Geographic Information System (GIS) software must be finalised and the resulting maps disseminated to all staff so that everyone reviewing DeePCee data is clear regarding the data's spatial extent. It is expected that the mapping process will be complete by April 2008.

The detailed reporting interface (see section 7) needs to be overhauled to ensure that the reports offered match the current database structures, again a lack of IT resources are the only barrier to this outcome.

Finally, a DeePCee workshop involving senior compliance staff from the department is planned for this year (2008) to discuss areas of the data collection's business rules that need clarification and to ensure that all aspects of the data collection are meeting the Department's reporting needs. It is likely that such a workshop would be held every 2-3 years as a means of ensuring that only relevant data are collected.

11.0 Conclusion (TJG)

This project describes the DeePCee compliance patrol reporting system, a methodology for collecting useful information resulting from fisheries compliance patrols, analysing and presenting it in a form that allows fisheries compliance programs to be evaluated and optimised. No doubt some jurisdictions across the world can boast similar systems that collect detailed information that can assist with qualitative assessment of compliance services, but the authors have been unable to find any evidence of a system like DeePCee that systematically captures and classifies all compliance patrol contacts made in time and space so that quantitative, fishery-specific, non-compliance rates can be determined. By classifying contacts as either random or targeted DeePCee accounts for any skewing of observed non-compliance rates by targeted compliance inspections. This project also illustrates how such resulting non-compliance rates can become powerful tools for fisheries managers and fisheries researches to help them grapple with the vexing issue of quantifying illegal fishing.

The DeePCee reporting system has taken several years to reach this stage of maturity, and it will likely take another 1-2 years before the full potential of the data that comprises it is being exploited fully. For the purposes of this research project, there were four objectives, which will be considered in turn.

1. To undertake data collection in order to measure the level of compliance and enforcement across the range of input and output managed fisheries in Western Australia, with a view to optimising the efficiency and effectiveness of the overall compliance program.

This objective has been completely achieved. Western Australia now has an extensive database of patrol activity classified according to over 90 fishery types. This information has resulted in many changes to the way compliance programs are delivered to individual fisheries. Indeed, the data collections established by this project are used routinely by departmental staff and now form the core data set of the compliance risk assessment process underpinning the delivery of all fisheries compliance in WA, as well as providing a useful resource for helping FMOs work more efficiently.

2. In conjunction with representatives from national fisheries compliance groups, to develop national standards for the collection and reporting of fishery-specific enforcement activity levels and compliance rates.

This objective has been partially achieved. A National workshop was held to attempt to develop national standards, but the resource estimates underestimated the magnitude of the task. Discussions and input from that conference did however shape the design of WA's DeePCee data collection and it is likely that the core features of this data collection will form the basis of such standards should any jurisdiction seek to develop their own version of DeePCee.

3. To determine how levels of enforcement and compliance vary spatially and temporally, including an examination of how the level and type of enforcement activity affects compliant behaviour. Planned management experiments will be used to assess how different levels of enforcement effort affect compliance outcomes within and between fisheries.

This objective has been almost completely successful. Determinations of spatial and temporal variations in compliance and enforcement effort have been extensive, but the next step – that of adjusting compliance delivery in response to the observed patterns, and consequent monitoring to determine that the adjustments have had the desired effect – has not happened to the same extent. It has been hampered by staff turnover on this project, and by changes

in the landscape of government in WA (incorporation of Marine Safety and Marine Park compliance responsibilities) that have diverted attention away from strategic issues to ensuring immediate reporting needs are met. Having said that, small but important examples have been presented that show how use of the DeePCee data has had (or will have) an effect on the way compliance is delivered in the future. While these are not strictly management experiments, such experiments will undoubtedly take place in the future once a suite of non-compliance rates are available for all the key fisheries in WA.

4. To examine the usefulness of Agency VFLO data for measuring trends in compliance, with a view to extending current VFLO data collection to include compliance-specific information.

This objective has been completely achieved, although the results of this objective are particularly specific to the WA compliance model. Nonetheless, it is to be expected that with the rest of the information provided in this report, other jurisdictions should be able to assess whether similar conclusions can be drawn in their own jurisdiction. In the case of WA, agency VFLO data is not useful in measuring compliance trends, although some, simplified, version of a systematic reporting system still has some merit.

To summarise, the DeePCee reporting system that was setup by this project has now been taken up (in slightly modified form from as originally rolled-out) by the entire compliance arm of the Agency and it has proven repeatedly that the value of the data that it provides more that compensates for the ongoing costs of continuing the project outside of the funding provided by this project.

12.0 References

Acheson, J. M., 2001. Confounding the Goals of Management: Response of the Maine Lobster Industry to a Trap Limit, *North American Journal of Fisheries Management*, **21**, 404-416.

Clay P. M. and Goodwin J. R., 1995. Utilizing social sciences in fisheries management, *Aquatic Living Resources*, **8**, 203-207.

Côté, I. M., Mosqueira, I. and Reynolds, J. D, 2001. Effects of marine reserve characteristics on the protection of fish populations: a meta-analysis, *Journal of Fish Biology*, **59** (1), 178-189.

Davis, B. C. and Moretti, G. S. 2005. Enforcing U.S. Marine Protected Areas: Synthesis Report Prepared by the National Marine Protected Areas Center in cooperation with the National Oceanic and Atmospheric Administration Coastal Services Center, July 2005, p11.

McKinlay J. P., 2002. Optimising the Efficiency and Effectiveness of Enforcement to achieve compliance in the Western Rock Lobster Fishery, *Final Report of project No. 1998/156*, Fisheries Research Development Corporation, ISBN 1 877098 13 2.

McLaughlan, N., 1994. Long term management Strategies for the Western Rock Lobster fishery: Law enforcement considerations, Volume 4, *Fisheries Management Paper No. 70*, Fisheries WA, Perth.

Nielsen J. R., 2003. An analytical framework for studying: compliance and legitimacy in fisheries management, *Marine Policy*, **27**, 425-432.

Sutinen, J. G., Rieser, A. and Gauvin, J. R., 1990. Measuring and explaining non-compliance in federally managed fisheries. *Ocean Development and International Law*, **21**, 335-372.

Sutinen, J. G., 1996. Fisheries Compliance and Management: Assessing Performance, A Report to the Australian Fisheries Management Authority, August 1996, 29p.

13.0 Appendices

Appendix 1. Intellectual Property

Data described in this report and resulting from the systems described in this report will be published in peer-reviewed journals in due course and in that respect it remains the intellectual property of those who have participated in its collection and analysis. There is no information of a commercially sensitive nature, although for confidentiality reasons, certain information relating to individual fishers has been withheld.

Appendix 2. Staff

Engaged using FRDC funds:

Mr J. P. McKinlay	Research Scientist
Mr Robert Humphreys*	Database Programmer
Ms Anita Ward*	Statistical Officer
VariousData	Entry Staff

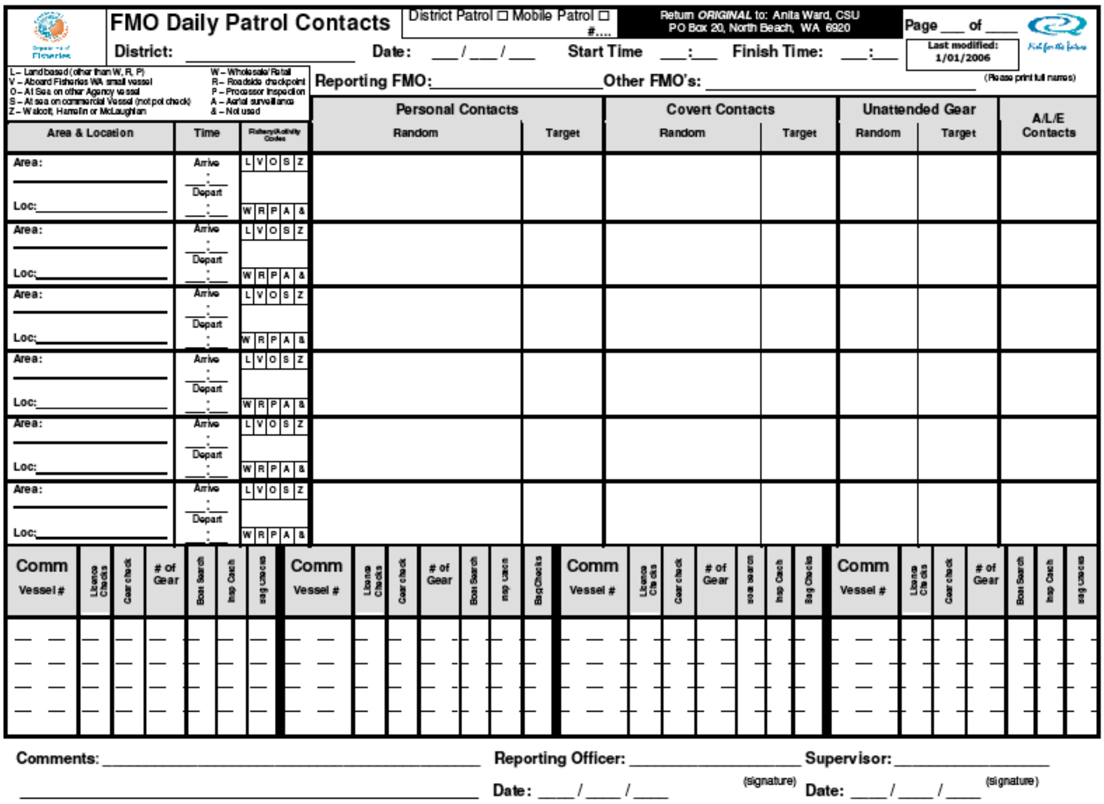
Engaged on non-FRDC funds and working closely on the systems established by this project:

Mr John Looby	Manager, Regional Services
Mr Neil Sarti	Compliance Manager
Ms Tina Thorne	Manager, Strategic Compliance
Mr David Grffiths	Acting Manager, Compliance Statistics Unit
Dr Timothy J Green	Manager, Compliance Statistics Unit
Dr N. Caputi	Research Supervisor
Shona James	Data Entry and Validation
Barbara Lawrence	Data Entry and Validation
Various Fisheries and Marine	Officers

*Denotes staff still involved with the project using non-FRDC funds.

Appendix 3. Data Collection Forms

Many of the forms contributing to the DeePCee data collection have gone through several iterations. Only the current versions in use are attached here.



FMO Daily Patrol Contacts

District Patrol ☐ Mobile Patrol ☐ #....

Return *ORIGINAL* to: Anita Ward, CSU
PO Box 20, North Beach, WA 6920

Page ___ of ___

District: ____________ Date: ___/___/___ Start Time ___:___ Finish Time: ___:___

Last modified: 1/01/2006

L – Land based (other than W, R, P)
V – Aboard Fisheries WA small vessel
O – At Sea on other Agency vessel
S – At sea on commercial Vessel (not pot check)
Z – Walcott, Hamelin or McLaughlan
W – Wholesale/ Retail
R – Roadside checkpoint
P – Processor Inspection
A – Aerial surveillance
& – Not used

Reporting FMO:____________ Other FMO's: ____________ (Please print full names)

Area & Location	Time	Fishery/Activity Codes	Personal Contacts: Random	Personal Contacts: Target	Covert Contacts: Random	Covert Contacts: Target	Unattended Gear: Random	Unattended Gear: Target	A/L/E Contacts
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							

Comm Vessel #	Licence Checks	Gear check	# of Gear	Boat Search	Insp Catch	Bag Checks	Comm Vessel #	Licence Checks	Gear check	# of Gear	Boat Search	Insp Catch	Bag Checks	Comm Vessel #	Licence Checks	Gear check	# of Gear	Boat Search	Insp Catch	Bag Checks	Comm Vessel #	Licence Checks	Gear check	# of Gear	Boat Search	Insp Catch	Bag Checks

Comments: ____________ Reporting Officer: ____________ (signature) Supervisor: ____________ (signature)

Date: ___/___/___ Date: ___/___/___

PO Daily Patrol Contacts

District Patrol ☐ Mobile Patrol ☐ #....

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Zone: ____________ Date: ___/___/___ Start Time ___:___ Finish Time: ___:___

L – Land based (other than W, R, P)
V – Aboard Fisheries WA small vessel
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R – Roadside checkpoint
P – Processor inspection
A – Aerial surveillance
& – Not used

Reporting FMO:______________ Other FMO's: ______________ (Please print full names)

Area & Location	Time	Fishery/Activity Codes	Personal Contacts Random	Personal Contacts Target	Covert Contacts Random	Covert Contacts Target	Unattended Gear Random	Unattended Gear Target	A/L/E Contacts
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							

W/Stk Vessel Nbr	Liaison Only	Covert Only	Licensee Code	License Checks PBL Vb	License Checks PBL Db	PBM	PDL	Form	Tags	Logbook	Quota Check NBR Oysters	Dump check	Aboard at sea	Transport Insp	Hold site Insp	Bd/Nav Mrk & Lg	Operations Insp	Not Used
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	

Hatch Licensee Code	Liaison Only	Covert Only	Number of People	Nursery Insp	Hatchery Insp	Quar Insp	Transp Insp.	Bd/Nav Mrk & Lg	Nursery Audit	Species Chk	NBR Oysters	Disease	Quota Tags	Quota Logbook	BStock Collect	Operations insp	Stocking report	Not Used
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	
	☐	☐		☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	

Comments: ______________________ Reporting Officer: ____________ (signature) Supervisor: ____________ (signature)

Date: ___/___/___ Date: ___/___/___

FMO Daily Patrol Contacts

District Patrol ☐ Mobile Patrol ☐ #....

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District: ____________ Date: ___/___/___ Start Time ___:___ Finish Time: ___:___

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Reporting FMO:______________ Other FMO's: ______________ (Please print full names)

Area & Location	Time	Fishery/Activity Codes	Personal Contacts Random	Personal Contacts Target	Covert Contacts Random	Covert Contacts Target	Unattended Gear Random	Unattended Gear Target	A/L/E Contacts
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ____ Loc: ____	Arrive __:__ Depart __:__	L V O S Z / W R P A &							

Comm Vessel #	Licence Checks	Gear check	# of Gear	BoatSearch	Insp Catch	Bag Checks	Comm Vessel #	Licence Checks	Gear check	# of Gear	Boat Search	Insp Catch	Bag Checks

Aqua License #	# of People	Boundary Check	Record Check	C Nose Check	Site Insp.	Nav Mrk & Lgt	License Chk	Species Chk	Vessel #	Quar/Disease	WASQAP Hout.	WASQAP Clos.	BStock Collect

Comments: ______________________ Reporting Officer: ____________ (signature) Supervisor: ____________ (signature)

Date: ___/___/___ Date: ___/___/___

FMO Rock Lobster Consignment Inspections

District:______________ Date: ___/___/___ Reporting FMO: ______________________________
(from where Patrol began)

Tick and complete section a) or section b) - as appropriate: Other FMO's: ______________________________

a) ☐ Consignment Inspections are the only patrol activity for these FMOs on this date. *You need not submit a DPC Form, but must enter the following:*

Patrol Start Time: ____:____ Finish Time: ____:____
☐ Breaks taken during inspections.
(Use one line per break to enter break start & finish times & type of break).

b) ☐ Other activities were also undertaken on this patrol.
You must complete a DPC form for all the patrol activities.

TIME (24h)	PREMISES CODE	LFB #	Target Insp?	Dble Bask?	Nbr BSKT	U/S	SET	TAR	SPN	O/S	Brch?	COMMENT/BREAKS
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
			☐	☐							☐	
TOTAL												

Reporting Officer: (signature) ______________________ **Supervisor:** (signature) ______________________

Date: ____ / ____ / ____ **Date:** ____ / ____ / ____

Return *ORIGINAL* to:
Anita Ward, CSU
PO Box 20, North Beach, WA 6920.
(Keep a copy in the district)

NOTES:
You must submit a new form for each patrol day. Detail any breaks of >15 minutes.
Point of landing checks: Enter "PoL", the DPC area code & the premises code (or NIF).
LFB #: the LFB number should be recorded in full eg: G057 not G57 or 57.
Target Insp?: Was the inspection targeted? Tick for yes, leave blank for random inspection.
Dble Bask?: Was it a double basket? Tick for Yes, blank for single (normal sized) basket.
Brch?: Tick if any offence detected (do not tick if only a verbal warning was issued)

Last Modified: 11/01/2007

Recreational Marine Safety Inspections
Last modified: 01/01/2007

District: | Date: / /

FMO's: | Page ___of___

WEST COAST BIOREGION

Return *ORIGINAL* to: Anita Ward, CSU
PO Box 20, North Beach, WA 6920

Contact Codes:				Equipment Checks:	Rec Survey Notes; Species Codes etc:
0 – Safety check	4 – No rego	9 – Poor navigation	14 – Other	Tick – correct/present	Y – has been fishing; W – will be fishing N – will not/has not fished
1 – Speed Checks	5 – Age of driver/obs.	10 – Mooring problem	15 – PWC	X – incorrect/absent	PS – Pink Snapper; DH – Dhufish, BR – Breaksea Cod; BG – Baldchin Groper;
2 – Out of ski area	6 – Tied to nav mark	11 – Tow/assist	16 – Nav. Lights	O – not required (or exempt)	HE – Herring; TA – Tailor; SC – Swimmer crabs.; RL – Rock Lobsters.
3 – No rego sticker	7 – 45 m offshore 8 – Obstr. channel	12 – General skiing 13 – General queries	17 – Rec Survey Only		Eg. Y W N | 1 | 1 | | | | | | 12

Area	Time 24h	Vessel Number	Contact code	Tick only ONE: PV		Land		Rego & Equipment Checks: Rego	Life Jacket	Flares	Para Flares	Fire Exting	Anchor & Line	Bilge & Bailer	Radio	EPIRB	Officer notes: # of people	Remarks	Rec. Fishing Survey: Fishing?	PS	DH	BR	BG	HE	TA	SC	RL
				[illegible]	[illegible]	[illegible]	[illegible]																				
																			Y W N								
																			Y W N								
																			Y W N								
																			Y W N								
																			Y W N								
																			Y W N								
																			Y W N								
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																			Y W N								
																			Y W N								
																			Y W N								
																			Y W N								
																			Y W N								
																			Y W N								

Comments: ______________________________ Reporting Officer: ____________ (signature) Supervisor: ____________ (signature)
______________________________ Date: ____/____/____ Date: ____/____/____

FMO Daily Patrol Contacts

District Patrol ☐ Mobile Patrol ☐ #....

Return *ORIGINAL* to: Anita Ward, CSU
PO Box 20, North Beach, WA 6920

Last modified: 1/05/2007

District: __________ Date: ___/___/___ Start Time ___:___ Finish Time: ___:___ Page ___ of ___

Reporting FMO: __________ Other FMO's: __________ (Please print full names)

L – Land based (other than W, R, P)
V – Aboard Fisheries WA small vessel
O – At Sea on other Agency vessel
S – At sea on commercial Vessel (not pot check)
Z – Walcott, Hamelin or McLaughlan
W – Wholesale/Retail
R – Roadside checkpoint
P – Processor Inspection
A – Aerial surveillance
& – Not used

Area & Location	Time	Fishery/Activity Codes	Personal Contacts: Random	Target	Covert Contacts: Random	Target	Unattended Gear: Random	Target	A/L/E Contacts
Area: ______ Loc: ______	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ______ Loc: ______	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ______ Loc: ______	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ______ Loc: ______	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ______ Loc: ______	Arrive __:__ Depart __:__	L V O S Z / W R P A &							
Area: ______ Loc: ______	Arrive __:__ Depart __:__	L V O S Z / W R P A &							

MP Contacts	Time In	Time Out	Fishery Code	# Fishers	# Non-fishers	Area Compliant ✓/✗	MP Contacts	Time In	Time Out	Fishery Code	# Fishers	# Non-fishers	Area Compliant ✓/✗	Comm Vessel #	Licence Checks	Gear check	# of Gear	Boat Search	Insp Catch	[illegible]

Comments: ______________________________ Reporting Officer: ____________ (signature) Supervisor: ____________ (signature)
______________________________ Date: ____/____/____ Date: ____/____/____

Commercial Marine Safety Inspections
Last modified: 01/01/2006

Return *ORIGINAL* to: Anita Ward, CSU PO Box 20, North Beach, WA 6920.

District: | **FMO:**

Area: | Inspection Date / / | Time (24hr) : | **Vessel Nbr:** (LFB/SPV/MAH) | Vessel Name

Master Name: (full name required) | D.O.B. / /

Quals: | State of Issue QLD ☐ NT ☐ VIC ☐ WA ☐ AMSA ☐ SA ☐ NSW ☐ TAS ☐ | **Verified:**

Address:

Phone:

Engineer Name: ☐ tick if same as master | D.O.B. / /

Quals: | State of Issue QLD ☐ NT ☐ VIC ☐ WA ☐ AMSA ☐ SA ☐ NSW ☐ TAS ☐ | **Verified:**

Address:

Phone:

Owner Name: ☐ tick if same as master | **Phone:**

Address:

Inspection Type (tick one):
Manning Chk? ☐
Part Survey? ☐
Full Survey? ☐

Vessel & Certificate

Survey Certificate Carried? ☐Yes ☐No ☐Exempt | MA5? ☐Y ☐N Nbr: | Vessel Classes / /

Length m | Unberthed Passengers | Total POB | Crew Nbrs

Engine Power kW | Berthed Passengers | Special Personnel

Notes (crew training, safety equipment, etc).

Special personnel comment:

Officer In Charge: *(print full name)* _____ Date: ___/___/_____

Supervisor: *(print full name)* _____ Date: ___/___/_____

Equipment Checks

(any 6 = a part survey)	Tick one Y	N	NA
Logbook			
Compass card			
Compass			
Clock/barometer			
Radio(s)			
Call sign(s)			
Life jackets			
Flares/pyrotechnics			
Medical kit			
EPIRB			
Torch			
Sound/signal horn			
Bilge alarm			
Bilge pump			
Freezer alarm			
Navigation lights			
Fire extinguishers			
Fire buckets			
Freeing ports clear			
Weather deck hatches			
Escapes clear			
Guardrails in good order			
Anchors			
Liferaft (free floating)			
Lifebouys (light/line)			

Department of Fisheries

Regional Services Office Contacts – Counter & Phone

Send to: Anita Ward, CSU, PO Box 20, N. Beach, WA 6920.

Right for the future

District: **Period:** / /06 to: / /06

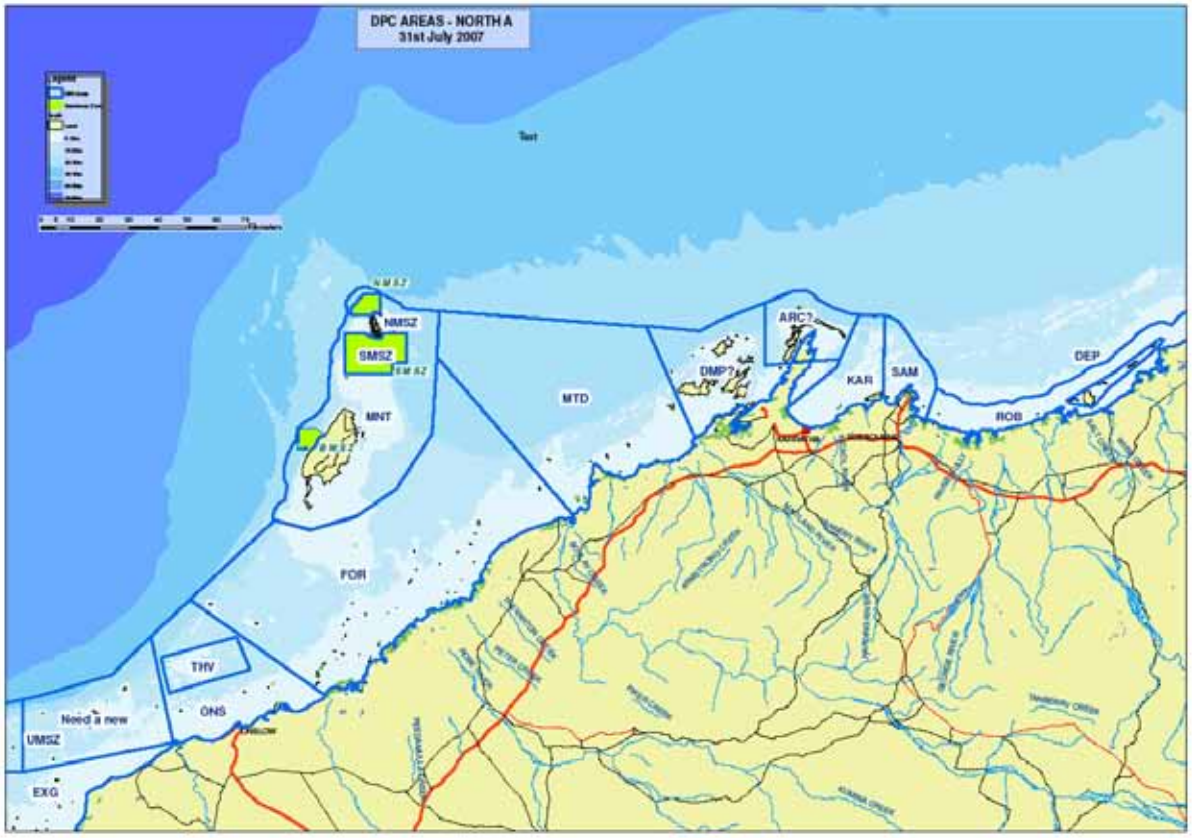
COMM	DESCRIPTION	Counter	Phone
AB03	Greenlip & Brownlip Compliance		
AB04	Roes Abalone Compliance		
EP03	Exmouth Prawn Compliance		
GA02	Commercial Other Fishery Compliance Gascoyne		
GA04	Exmouth Gulf Beach Seine & Mesh Net Fishery		
GA05	Shark Bay Beach Seine & Mesh Net Fishery		
GA06	Shark Bay Beche-de-mer		
GA07	Shark Bay/Carnarvon Crab		
ME02	Commercial Other Fishery Compliance Metro		
ME04	Comet Bay Crab		
MT02	Kimberley Prawn Compliance		
MT06	Abrolhos Island Trawl Compliance		
MT08	Broome Prawn		
MT09	Nickol Bay Prawn		
MT10	Onslow Prawn		
MT12	Minor Trawl Other Compliance		
MW02	Commercial Other Fishery Compliance Midwest		
ND03	Northern Demersal Scalefish Compliance		
NH02	Commercial Other Fishery Compliance North		
NH07	Lake Argyle Catfish		
NH10	Northern Demeral Compliance & VMS		
PT02	Pilbara Trawl Compliance & VMS		
PM52	Pearling - Wildstock		
PM53	Pearling - Hatchery		
RL03	Western Rock Lobster Compliance		
SH02	Commercial Other Fishery Compliance South		
SH04	Australian Salmon (South West)		
SH05	Australian Salmon (South Coast)		
SH06	Herring Trap Fishery		
SN02	Shark Bay Snapper Compliance		
SN40	Non Maxima Pearl Management		
SP03	Shark Bay Prawn Compliance		
SS03	Shark Bay Scallop Compliance		
SS99	Specimen Shell Fishery		
SW02	Commercial Other Fishery Compliance Statewide		
CMP	Marine Parks		
AQUA	Aquaculture Enquiries		
DOT	DPI - Dept of Fisheries Marine Safety		
GEN	General Enquiries		
VFLO	Volunteer Fisheries Liaison Officers		
FHP	Fish Habitat Protection		
LIN	Licences - Commercial and Rec. Enquiries		
IND	Indigenous Issues		
RECR			
R-AB	Abalone		
R-RL	Rock Lobster		
R-MA	Marron		
R-MFB	Marine Finfish (boat)		
R-MFS	Marine Finfish (shore)		
R-CB	Crabs		
R-FF	Freshwater Finfish		
R-CHE	Fishing Charters or Tours (extractive activities)		
R-CHN	Fishing Charters or Tours (non-extractive)		
R-CM	Cockles and mussels		
R-NET	Net fishing		
R-PR	Prawns		
R-OT	Other (all rec categories not accounted for above)		
R-AB(U)	Unlicensed Commercial Abalone		
R-RL(U)	Unlicensed Commercial Rock Lobster		
R-MFB(U)	Unlicensed Commercial Marine Finfish (boat)		
R-MFS(U)	Unlicensed Commercial Marine Finfish (shore)		
R-CB(U)	Unlicensed Commercial Crabs		
R-NET(U)	Unlicensed Commercial Net Fishing		
R-PR(U)	Unlicensed Commercial Prawns		

Note: A new form must be started at the beginning of each month

Modified: 17/02/2006

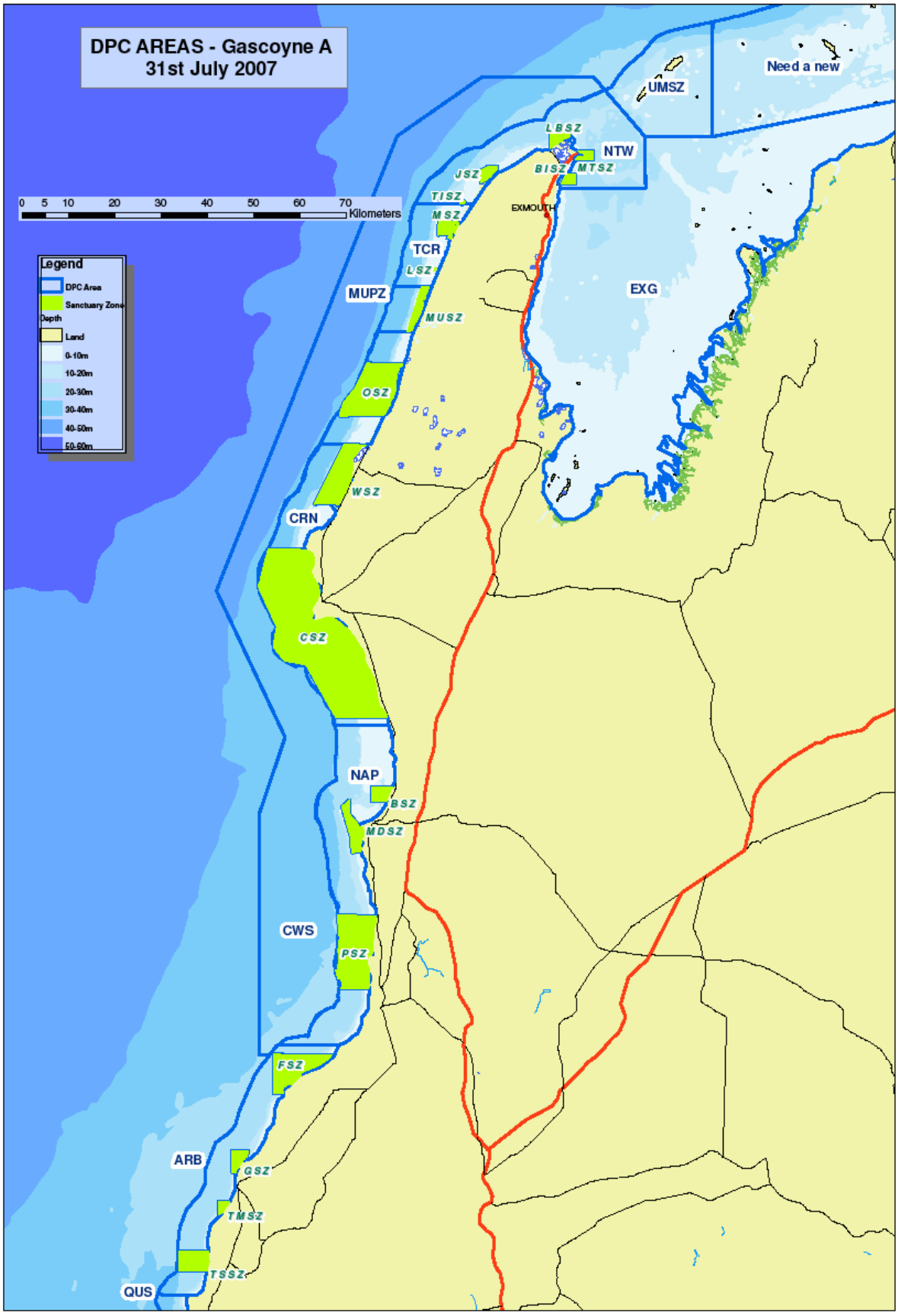
Appendix 4. The DPC areas

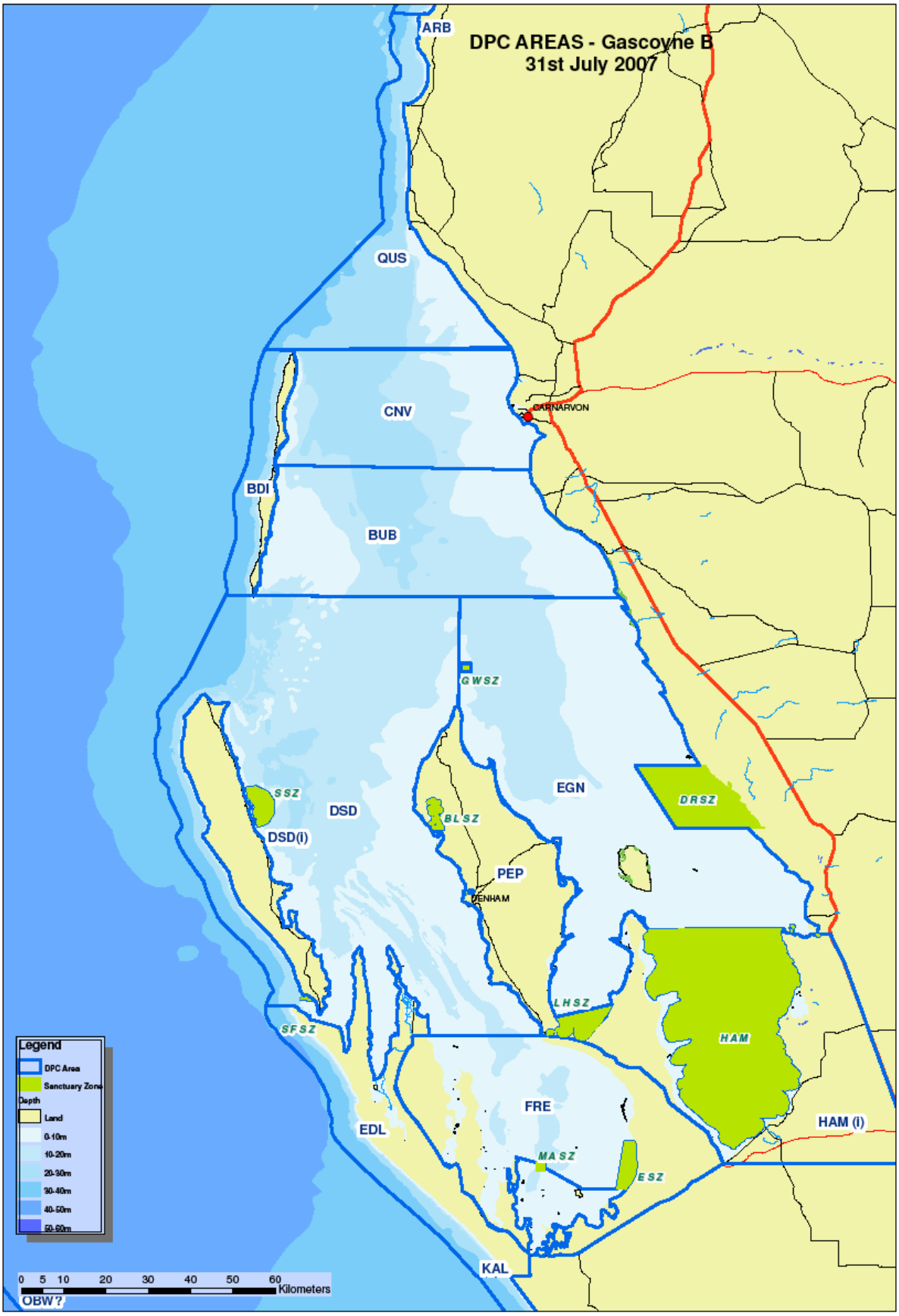
The spatial capture of patrol information on the DPC form is based on "DPC Areas". These are defined areas of geographic extent that are currently in the process of being explicitly mapped. A listing of areas can be found in the attached manual (Appendix 5), and the current provisional maps are appended here. The DPC areas are shown with heavy blue boundaries, sanctuary zones are shaded green. The short acronyms correspond to those given in Appendix C of the DPC Manual (attached as Appendix 5 of this document). The maps are more up do date than the listing in the manual and so some mapped areas may not appear in the manual listing.

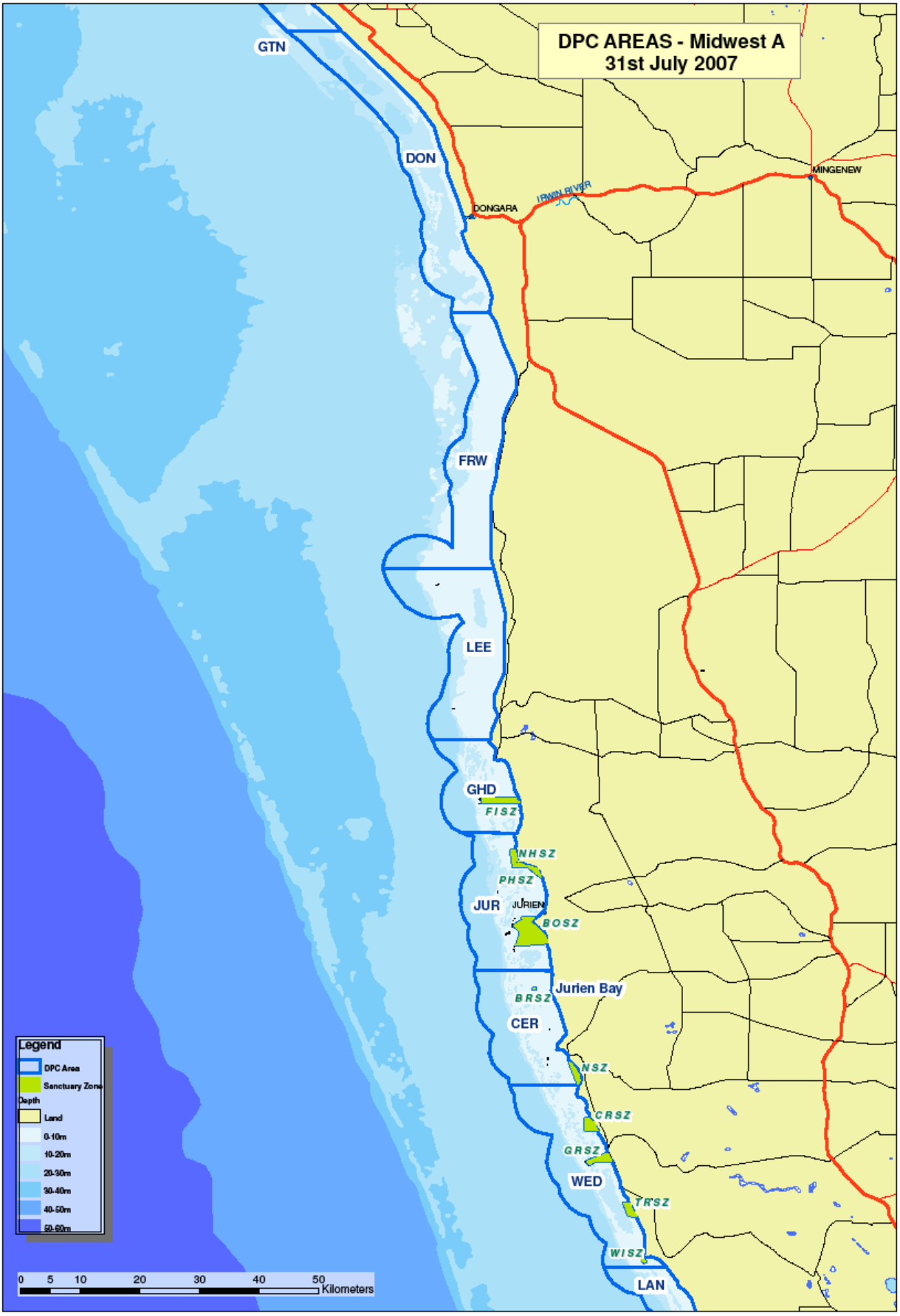


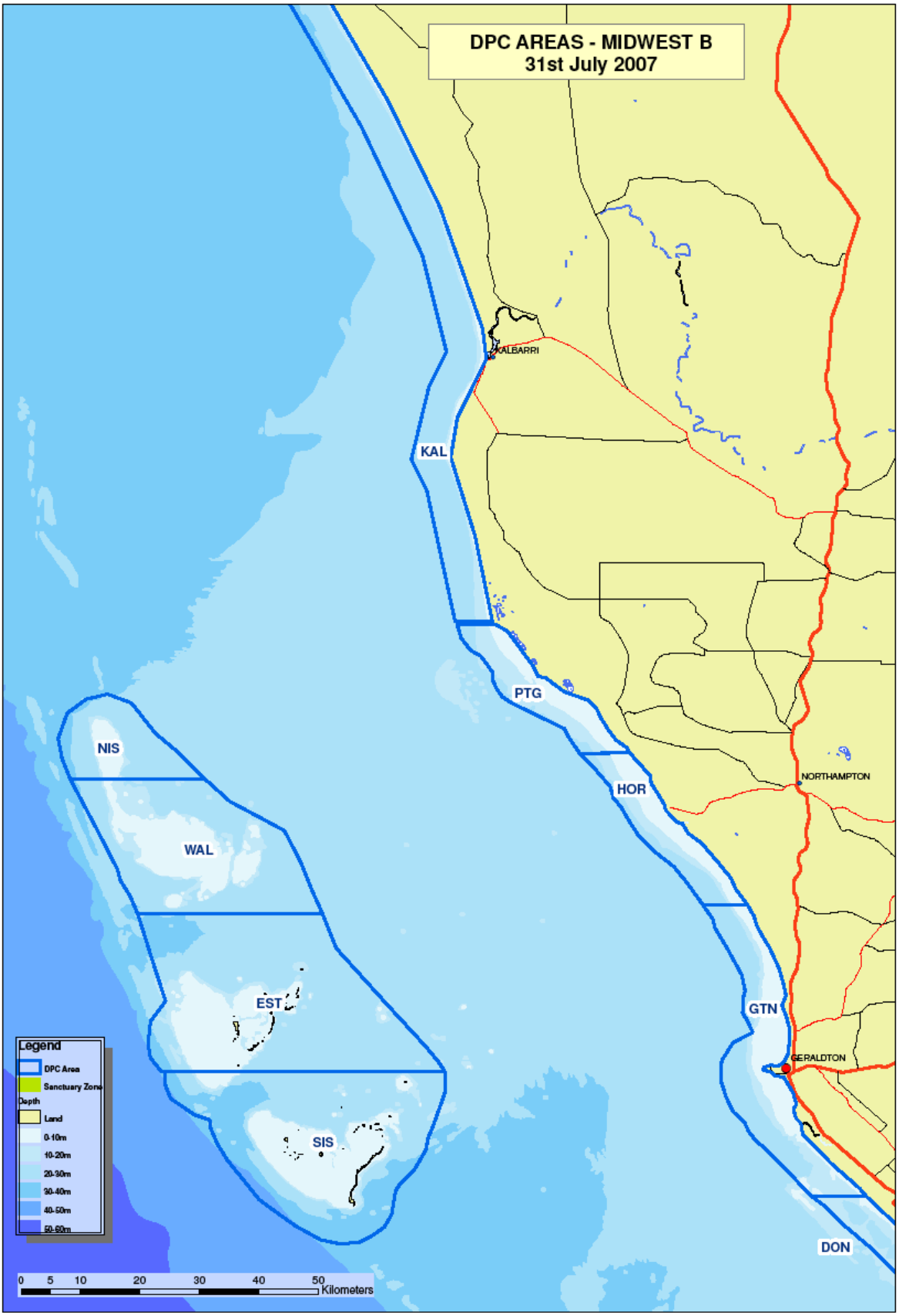

DPC AREAS - NORTH B
31st July 2007
ROW
HCL
CKB
KIS?
DBY?
WHC
CBL?
BRM?
CWC
FTZ?
RBB
BVL
SND
DGY
HED
ROB
DEP

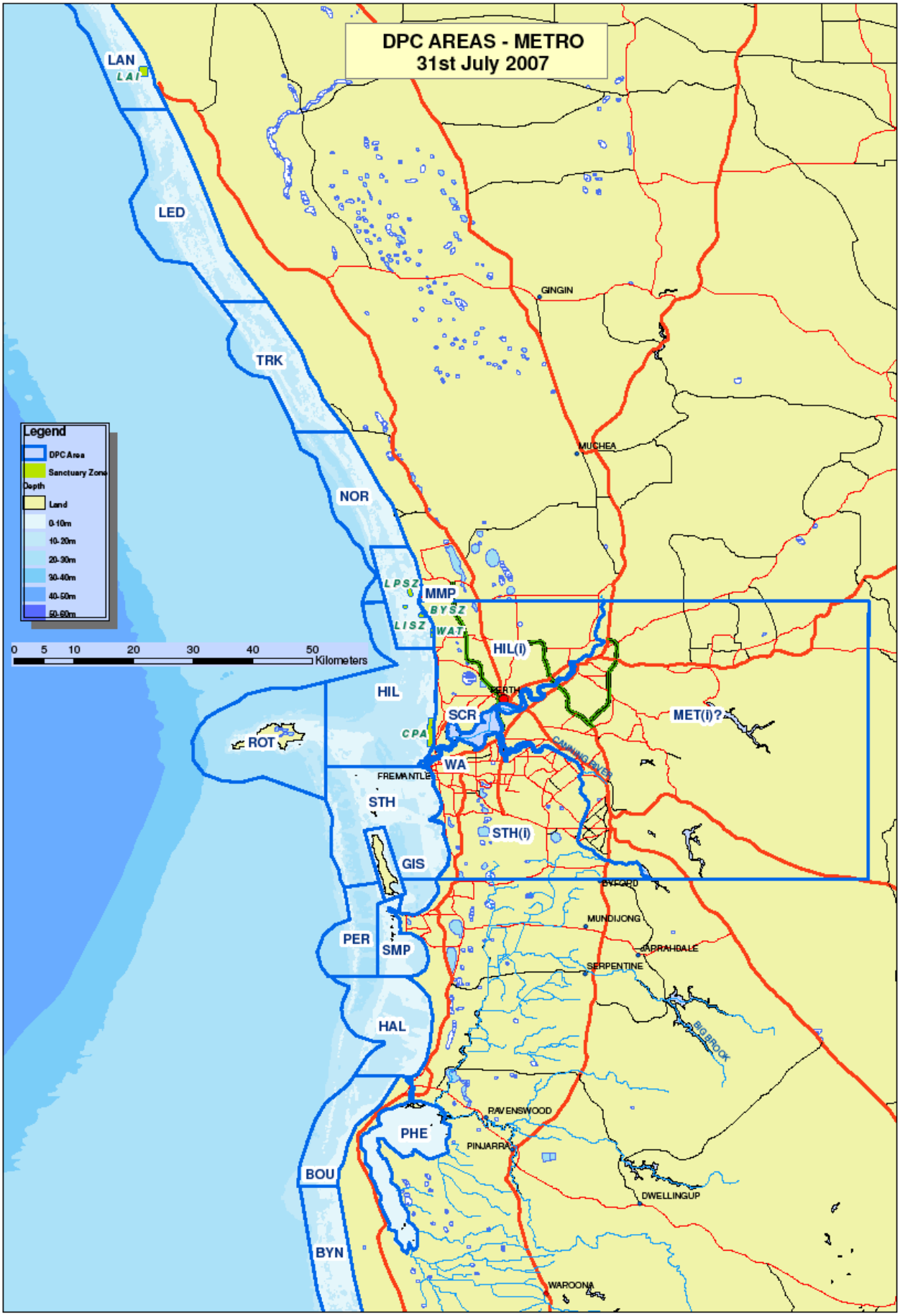

DPC AREAS - NORTH C
31st July 2007
SBA
BCL
LCD
CAW
CNT
KBI
ORD?
CKB
ARG?
KIS?
DBY?
FTZ?


DPC AREAS - Gascoyne A
31st July 2007
0 5 10 20 30 40 50 60 70
Kilometers
Legend
DPC Area
Sanctuary Zone
Depth
Land
0-10m
10-20m
20-30m
30-40m
40-50m
50-60m
Need a new
UMSZ
LBSZ
NTW
BISZ
MTSZ
JSZ
TISZ
MSZ
EXMOUTH
TCR
LSZ
MUPZ
MUSZ
EXG
OSZ
WSZ
CRN
CSZ
NAP
BSZ
MDSZ
CWS
PSZ
FSZ
ARB
GSZ
TMSZ
TSSZ
QUS


DPC AREAS - Gascoyne B
31st July 2007
ARB
QUS
CNV
CARNARVON
BDI
BUB
GWSZ
SSZ
DSD
DSD(i)
EGN
DRSZ
BLSZ
PEP
DENHAM
LHSZ
HAM
SFSZ
FRE
EDL
HAM (i)
MASZ
ESZ
KAL
Legend
DPC Area
Sanctuary Zone
Depth
Land
0-10m
10-20m
20-30m
30-40m
40-50m
50-60m
0 5 10 20 30 40 50 60
Kilometers
OBW?


DPC AREAS - Midwest A
31st July 2007
GTN
DON
DONGARA
IRWIN RIVER
MINGENEW
FRW
LEE
GHD
FISZ
NHSZ
PHSZ
JUR
JURIEN
BOSZ
Jurien Bay
BRSZ
CER
NSZ
CRSZ
GRSZ
WED
TRSZ
WISZ
LAN
Legend
DPC Area
Sanctuary Zone
Depth
Land
0-10m
10-20m
20-30m
30-40m
40-50m
50-60m
0 5 10 20 30 40 50
Kilometers


DPC AREAS - MIDWEST B
31st July 2007
KALBARRI
KAL
PTG
NIS
HOR
NORTHAMPTON
WAL
EST
GTN
GERALDTON
SIS
DON
Legend
DPC Area
Sanctuary Zone
Depth
Land
0-10m
10-20m
20-30m
30-40m
40-50m
50-60m
0 5 10 20 30 40 50
Kilometers


DPC AREAS - METRO
31st July 2007
LAN
LAI
LED
TRK
NOR
LPSZ
MMP
BYSZ
LISZ
WAT
HIL(I)
HIL
SCR
CPA
ROT
WA
FREMANTLE
STH
STH(I)
GIS
PER
SMP
HAL
PHE
BOU
BYN
MET(I)?
GINGIN
MUCHEA
BYFORD
MUNDIJONG
SERPENTINE
PAVENSWOOD
PINJARRA
DWELLINGUP
WAROONA
Legend
DPC Area
Sanctuary Zone
Depth
Land
0-10m
10-20m
20-30m
30-40m
40-50m
50-60m
0 5 10 20 30 40 50
Kilometers


DPC AREAS - SOUTH (A)
31st July 2007
Legend
DPC Area
Sanctuary Zone
Depth
Land
0-10m
10-20m
20-30m
30-40m
40-50m
50-60m
BOU
PHE
BYN
HAR
COL
BYS
GEO
DBK
CBA
IRN
WCT
IRS
SCT
SWH
RWW
RWD
BTW
WTD
DTA
ALH
ATR
0 25 50 100 150
Kilometers


DPC AREAS - SOUTH (B)
31st July 2007
ISA
FTS
SID
DUD
DUI
RTF
ATR
Legend
DPC Area
Sanctuary Zone
Depth
Land
0-10m
10-20m
20-30m
30-40m
40-50m
50-60m
0 25 50 100 150 200 250
Kilometers

Appendix 5. The DeePCee Manual v2.4

Daily Patrol Contacts

Regional Services Patrol Contacts Recording System

Manual Version: 2.4

Release Date: 1 September 2005

All Enquires:

Compliance Statistics Unit

Department of Fisheries
39 Northside Dr
HILLARYS 6025
Telephone: 9203 0234

Department of Fisheries
Government of Western Australia

Fish for the future

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OVERVIEW

The Daily Patrol Contacts (DPC) system is a methodology for recording and reporting compliance field activity of Fisheries and Marine Officers (FMOs) servicing Western Australian fisheries. The system comprises 3 components, referred to as: **a) Daily Patrol Contacts (DPC)** and **Marine Safety Inspection (MSI) Form** – the data collection form used by FMOs to collect data in the field; **b) DPC Manual** – a manual (this document) providing directions for collection and validation of data; and, **c) DeePCee** – the Microsoft Access database holding the historical data. Those collecting the data (FMOs) and wishing to interpret the data (fishery managers) need to be familiar with this document; compliance/enforcement is a complex business and data may be prone to misinterpretation unless those examining the data have a good understanding of how the data are collected.

This document outlines the requirements for completing the DPC Form, as well as providing definitions of important terms. A number of practical examples are provided towards the end of the document. A separate companion document, intended to be left in the district offices, provides instruction on how to use the reporting system for historical data available through the DeePCee database.

The aim of the DPC system is to record FMO activity over almost all recreational and commercial fisheries serviced by the Department of Fisheries (WA) (DoF). The DPC form must be filled in by all FMOs undertaking field contact duties, however there are a few minor exceptions to this rule that are outlined in the manual. It is intended that the ***reports should be completed in the field, not when FMOs return to the office*** at the end of a patrol.

The recording system has been designed to be as simple as possible to complete in the field, while at the same time capturing important information relevant to the management of the Department's compliance program. The system was developed in consultation with all FMOs around the state, and many of the suggestions by FMOs have been incorporated into the system. Recreational contacts are recorded by a simple scoring system across a range of contact types. Additional inspection check details are recorded for commercial fishing vessels and aquaculture operators.

A major change to the way in which the data is collected occurred on 1 July 2005. Changes were made to the DPC and MSI forms to increase the efficiency and reduce the error rate of data collected. These changes have required an overhaul of the user manual, which has also incorporated instructions for the MSI forms for the first time. If you identify deficiencies with this manual please advise the Manager of the Compliance Statistics Unit and the document will be amended/added to as necessary.

A CD containing current and historical DPC data will be distributed as regularly as practical. Officers should give some thought to additional reports that might be developed to assist you in the day-to-day operation of the compliance program.

PART ONE - FISHERIES INSPECTIONS

1 Contact Details

The contacts part of the DPC Form records area/location information, time spent at a location, fisheries serviced, the type of activity undertaken and the number and type of contacts obtained. All ***non-commercial contacts are recorded as dashes*** or as a number, while ***commercial contacts, contacts with aquaculture operations, and charter contacts are recorded using the vessel number (LFB or SPV number) or aquaculture licence number respectively***. The example below shows some recreational boat anglers (R-MFB) and commercial rock lobster (RL03) contacts made at Ledge Point (area = LED). Note that <u>if two fisheries are serviced in the same location, they are each recorded as a separate line</u> in the contacts section of the form.

FMO Daily Patrol Contacts — District Patrol ☐ Mobile Patrol ☐ #..

Department of Fisheries

District: Lancelin **Date:** 11 / 01 / 05 **Start**

L – Land based (other than W, R, P) | W – Wholesale/Retail
V – Aboard Fisheries WA small vessel | R – Roadside checkpoint
O – At Sea on other Agency vessel | P – Process or Inspection
S – At sea on commercial vessel (not potcheck) | A – Aerial surveillance
Z – Walcott, Hamelin or McLaughlan | & – Not used

Reporting FMO: Lisa Farrington

Area & Location	Time	Fishery/Activity Codes	Personal Contacts: Random	Personal Contacts: Target
Area: LED Loc:	Arrive 11:25 Depart :	L V O S Z R-MFB W R P A &	𝍸 I	
Area: " Loc:	Arrive . Depart 12:35	L V O S Z RL03 W R P A &	F086; F111; F005; G215;	B100

Comm Vessel #	Licence Check	Gear check	# of Gear	Boat search	Pot Catch	Bag Check
F086	✓					
F111	✓			✓		
F005	✓			✓		
G215	✓					
B100	✓			✓	✓	

The example above shows 5 commercial rock lobster contacts (one targeted) and 6 recreational contacts while FMOs were in a DoF small vessel. Contacts are recorded into the corresponding fishery code. Commercial vessel check details are also recorded on the lower part of the DPC form.

1.1 AREA

Record the major area of the patrol. Each district has a list of 3 letter codes for predefined areas within districts. A list of area codes is attached as Appendix B. Note that Area/Location information does not have to be written on each line if more than one fishery is serviced within an area (just use ditto marks).

1.1.1 Marine Park Patrols

Some Areas and their geographical boundaries have been based around Marine Park (MPs) boundaries and the various types of use 'zones' within them. In areas such as Jurien and Exmouth where there are now FMOs employed to provide services to MPs, it is important to be able to accurately report on the number of contacts that are being obtained during MP compliance activities. It is expected that where a FMO is conducting a patrol in an area of a MP they will be providing Marine Park compliance services wherever possible. Where a patrol, or part of a patrol entails no MP specific compliance work e.g. RL03 pot check, then the same Area code should be used, with the addition of a (n) in brackets.

1.1.2 Inland Patrols

When officers devised area lists within each district, some assigned specific codes to refer to inland areas they regularly patrolled. Other districts did not assign inland codes, primarily because patrol work only occasionally occurred away from the coast. In general, if there is no specific inland code associated with an area it is assumed that the patrol is occurring on or very near the coast. If, on occasion, work does take officers inland away from the coast, then the coastal code should be used with the addition of **– (i)** after the code. For example, the area code for Perth north of the river is NOR. If officers are conducting restaurant checks in this area, but several suburbs inland from the coast, they should use the code **NOR – (i)**. Of course, this is not necessary if you already have a specific inland code to account for an area.

1.1.3 No Contacts In An Area (fishery codes PEF and NEF)

Note that Area details ***must*** be entered even if no contact with fishers occurs within a particular area. This is because it is also important that we have information about where and when people ***are not*** fishing. If this is the case, one of two codes should be entered as the Fishery Code. Use the code **PEF** (possible evidence of fishing) to indicate that no fishers were present, but there was possible evidence of fishing activity. Examples might include trailers or vehicles present at a location, but no people in sight. **Do not use this code if a location shows *past* signs of fishing activity**, such as old camp fires or bait wrappers. Alternatively, use the Fishery Code **NEF** to indicate no evidence at all of fishing activity (ie. no people, nor trailers, nor vehicles). ***If there are trailers or vehicles, you do not have to count or record them – all you have to do is note the fishery code as PEF.***

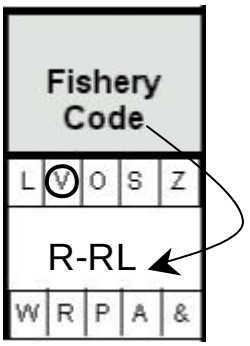
1.2 LOCATION

If required, record the specific Location (within Area) where the patrol took place, however the ***Location is optional***, with the exception of formal pot checks done in conjunction with a large PV (see example in FAQs). For normal departmental reporting purposes it is seldom used, however does have it's application from a management perspective. Let's say, for example, that there is a known compliance problem in a particular part of your district and that some fishery interest groups are becoming increasingly vocal in unfairly criticising district officers. It might be useful for officers to have detailed information on that location to be able to counter any unwarranted criticism. In general, consider location as an optional, high-resolution tool to allow you to collect fine scale data on a needs basis.

1.3 ARRIVAL & DEPARTURE TIME

Record the arrival and departure time for each Area/Location in 24h format. Note that you do not have to write the time for each line on the form (in the event you record contacts in multiple fisheries at a single location), but you must fill out the arrive/depart time for each new Area/Location visited.

1.4 FISHERY CODE



Each recreational and commercial fishery has an assigned fishery code. There are 4 types of fishery codes: Commercial, Recreational, Aquaculture, and Other. The Other category accounts for some types of work that do not neatly fall within any one fishery (these are discussed under the heading Special Fishery Codes below). These codes have been provided as Appendix A of this document. All contacts and patrol activities should be recorded against one of these codes. It is recommended that FMOs copy the fishery codes and keep them permanently attached to a clipboard for field entry of data. The adjacent example indicates recreational rock lobster fishers were contacted while FMOs were on patrol aboard a Department of Fisheries small vessel (the "V" is circled).

1.4.1 DPC Fishery Codes and Axiom Fishery Codes

Where possible, DPC codes for commercial fisheries have been chosen to align with codes used in the Axiom time reporting system, with the exception of a few new commercial codes that have been introduced to the DPC system at the request of FMOs.

1.4.2 Unlicensed Commercial Activity ("Shamateurs")

Some specific fishery codes have been introduced to represent contacts with unlicensed commercial fishers (UCF). These types of fishers have historically been termed "shamateurs", although usage of this term is now being discouraged. The term is ill defined outside fisheries circles and compliance managers at a national level are encouraging the use of the phrase unlicensed commercial fishers to identify unlicensed illegal operators who profit (through sale or barter) from illegal fishing activities. Record UNLICENSED FISHING activity by simply using the appropriate recreational code, but add the suffix **(u)**. For example, if unlicensed commercial abalone fishers are contacted, record this against fishery code **R-AB (u)**.

1.4.3 NEF & PEF – No Evidence or Possible Evidence of Fishing

See 1.1.3 for a description and example of where these codes are applied.

1.4.4 MEAL – When a meal break occurs during patrol

This code indicates that FMOs have stopped duty in order to take a meal break. Please ensure you circle L, V, O, or S to indicate if the break was taken on land or at sea.

1.4.5 FK – Fish Kills

Use this code to account for attendance at fish kills (i.e. attendance mass fish mortality events). Simply record one "contact" per event attended.

1.4.6 S-SHK – Shark Patrol

This should be used to record work associated with patrolling waters in order to sight sharks as part of a shark incident response. Remember to record each Area visited (you do not need to record any contacts).

1.4.7 NSF – Non-State Fisheries

Use this code for non-state fishery work. Occasionally FMOs will be required to conduct inspections of vessels operating in Commonwealth fisheries – use this code in those instances. Record vessel details in the same fashion as State commercial vessels.

1.4.8 FHP – Fish Habitat Protection work

This code is distinct to conducting Marine Park compliance work. Use this code for fish habitat and protection work. Note that this code should only be used if conducting fieldwork for the FHP section (e.g. collecting water quality samples, or something similar). Normal checks of recreational and commercial fisheries that occur in FHP Areas (or any marine protected areas) are recorded against the appropriate fishery code (or NEF/PEF if no contacts are made) and the Area code designates the special status of the marine protected area (note: all protected areas must be assigned their own area code).

1.5 ACTIVITY CODES

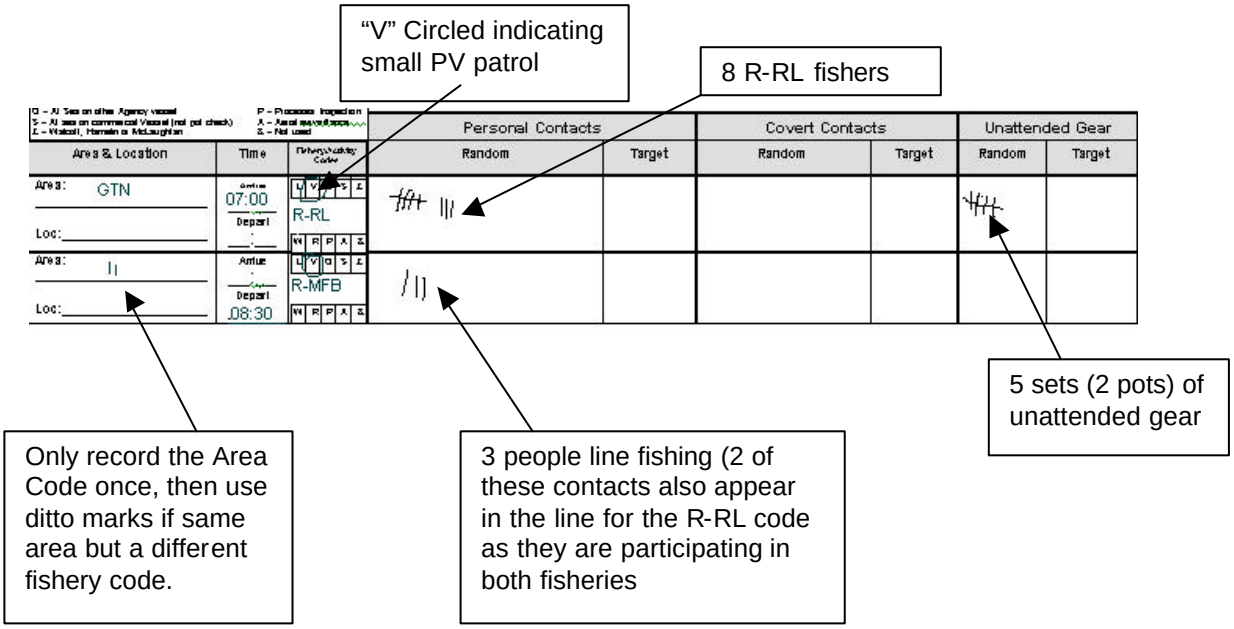
For the purposes of the DeePCee system there are seven different categories of activities that FMOs may be involved in figure opposite). Each has it's own code, one of which must be circled for each entry on a DPC form (see example). The codes are:

- L - Land based patrols
- V - Aborad DoF small vessel
- O – At sea other agency vessel
- S – At sea on commercial vessel (not pot check)
- Walcott, Hamelin, McLaughlan
- W – Wholesale/Retail inspections
- R – Roadside checkpoint
- A – Aerial surveillance

2 Contact Fields

2.1 FIRST, AN EXAMPLE

Let's examine an example. Lets say you are doing a small boat patrol in Geraldton. You come across 8 recreational rock lobster fishers from 6 boats, and a single person who is line fishing from a boat. Of the rock lobster fishers, 2 of the boats (1 person per boat) are line fishing. You also check 5 sets of unattended recreational gear. Sounds complicated, but its not. This patrol would be recorded in the following way:



2.2 RANDOM AND TARGET CONTACTS

Personal, Covert or Unattended Gear contacts can be either Random or Target. A random contact is a contact that has had no prior information to influence the decision to inspect a particular person or vessel etc.

A targeted contact is one that takes place as a result of information received regarding an offender resulting in an inspection occurring. Note that target contacts can only be applied to an individual, not a fishery or particular location e.g. a decision to conduct a blitz on recreational crabbing – while the fishery is being targeted, the contacts obtained would be recorded as random personal contacts, not targets.

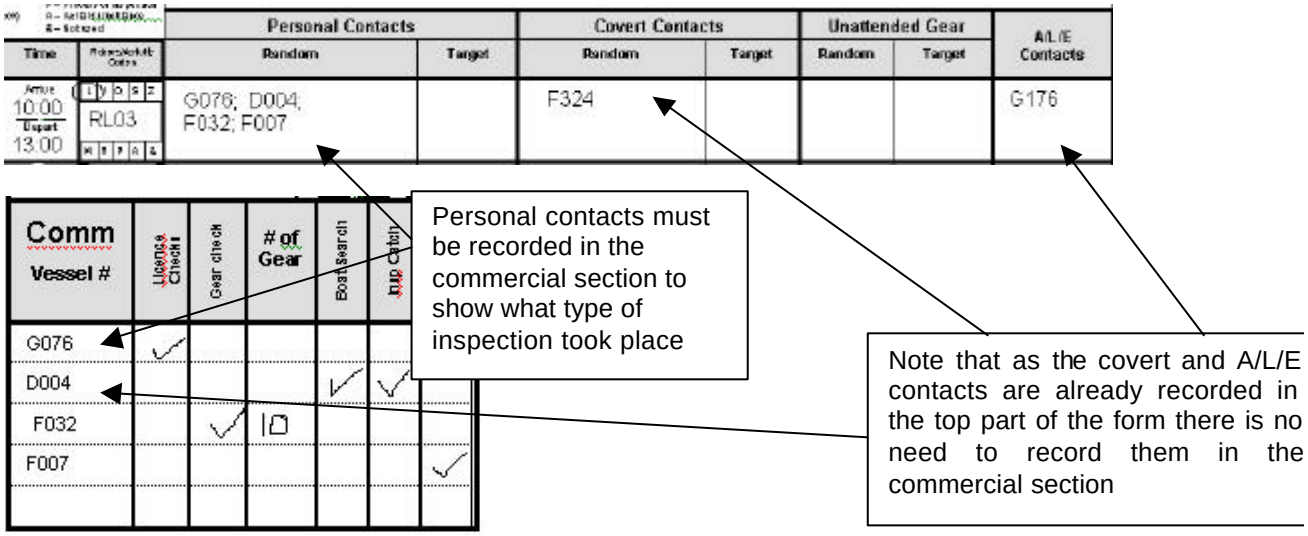
2.3 UNATTENDED GEAR

Recreational: Record the number of pots checked in tally style. If two pots are checked from one fisher, then it should be recorded as one contact.

Commercial: Record the corresponding LFB number of gear (pots/nets/traps) checked. The LFB number will be recorded in the unattended gear column (the top half of the form) and also in the Commercial check section, which requires the number of pots inspected to be recorded. See the gear check explanations under the commercial section.

3 Commercial Vessel Check Details

At the bottom of the form, there is a section to record details of ***individual commercial vessel checks and charter operation checks***. Here you must enter the commercial or charter vessel number and tick the appropriate boxes to indicate the compliance checks undertaken. Commercial vessels that appear in the Contact Details part of form (upper section) ***must*** also appear in the Vessel Check Details (with the exception of 'A/L/E' and 'Covert' contacts. This means you will have to write commercial vessel LFB numbers twice. Please note that more than one type of inspection can be carried out for any one vessel, the different tick boxes will simply have to be filled in accordingly. Before examining each check type in detail, consider an example:



G176 – liaison with skipper from commercial vessel**
G076 – board vessel and do licence checks
D004 – conduct boat search and catch inspection
F324 – covert contact with vessel**
F032 – check escape gaps on 10 pots that are being changed over
F007 – check the crew's bags as they depart the vessel

****NOTE** that there is no entry in the commercial section of the form for G176 and F324 as these are liaison and covert contacts respectively. As the type of contact is already known (as the LFB numbers will have been recorded in the top section of the form) there is no need to write them out again in the commercial section.

3.1 ADVICE / LIAISON / EDUCTION (A/L/E) ONLY

Simply record the LFB number in the A/L/E section in the top half of the form (no need to repeat in the bottom half). If a LFB number is recorded in the liaison section it should not appear anywhere else for that inspection otherwise it is not a liaison contact (see definition for A/L/E).

3.2 COVERT ONLY

Same rules as liaison, but record in the covert section only.

3.3 GEAR CHECK

Gear check now refers to any commercial fishing gear that is inspected e.g. pots, traps, gill nets, trawl nets etc. Write only the LFB number only in the top half of the form under either random or target contact section. In the Commercial section of the form, write the LFB number and tick the 'Gear Check' box. Record the amount of gear checked under the 'NBR Gear' column. See example below:

3.4 LICENCE CHECKS

Tick this box if the licences of the LFB have been inspected. It is assumed that if a licence check is conducted that all licences relevant to the vessel will have been checked. Record the LFB number in the 'Personal Contacts' section and also record the LFB number in the Commercial section and tick the 'Licence Checks' box.

3.5 INSPECTION OF CATCH

Tick this if you have checked the catch as it has been landed, either on the vessel, on the beach, on the jetty or at a processor (other than a western rock lobster processor). Record the LFB number and tick the 'Insp Catch' column.

3.6 BOAT SEARCH

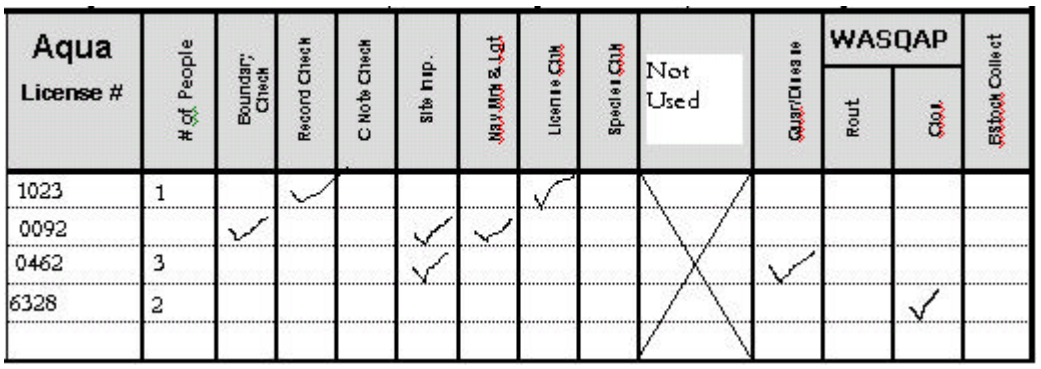
Mark this box if you have conducted a boat search. Record the LFB number and tick the 'Boat Search' column.

3.7 BAG CHECKS

Where the bags of a LFB crew are checked for TPF, tails etc. Record the LFB number and tick the 'Bag Check' column.

4 Aquaculture Checks

As aquaculture plays an increasingly important role in field duties, it is necessary that we begin to collect information about these inspections. This has been accomplished by introducing a range of checkboxes similar to those used for commercial vessel checks. In fact, the structure of the aquaculture checks panel of the DPC form is similar to the commercial checks panel – just the names have changed. This was done to simplify the database structure and save on time involved in incorporating the new checks. You will see that 3 columns are not used and these are crossed out (they may be used in future). Explanations of the individual checks are provided below.



Aqua License #	# of People	Boundary Check	Record Check	C Note Check	Site Insp.	Nav Mrk & Lgt	License Chk	Species Chk	Not Used	Quar/Disease	WASQAP Rout	WASQAP Clos.	EStock Collect
1023	1		✓				✓						
0092		✓			✓	✓							
0462	3				✓					✓			
6328	2											✓	

With the introduction of aquaculture checks there are now two versions of the DPC form. One version does not include the section for aquaculture checks, and so allows 20 commercial vessel checks to be recorded on a single side of the form. The other version does contain aquaculture checks, providing room for 5 aquaculture checks and 10 commercial vessel checks on a single side. Two versions have been issued so that on days when you know you will not be undertaking aquaculture checks, you can take a version of the form that allows for more commercial checks to be recorded.

4.1 LICENCE NBR

Record the licence number of the aquaculture facility. Some operators may be doing business, but have not yet been formally issued a licence number. For inspection of these operators, use generic code AQP (aquaculture licence pending) to indicate we do not yet have a licence number.

4.2 COVERT & LIAISON ONLY

As per commercial and recreational components of DPC form.

4.4 NBR PEOPLE

Record the number of people contacted during the check.

4.5 BOUNDARY CHECK

This checkbox applies to marine aquaculture sites only. Tick if a check was made to ensure that aquaculture gear was confined within the boundaries of the site as defined on the aquaculture licence map.

4.6 RECORD CHECK

This check ***excludes consignment notes***, since they have their own checkbox (below). Tick if you have sighted any of the following: broodstock records, juvenile records, records of mortality or possible disease incidents, records of environmental monitoring, or any other records required to be kept as denoted on the aquaculture licence.

4.7 C-NOTE CHECK (Abalone only)

Consignment note check (excluding marron). Tick if the consignment note has been sighted on abalone shipments during transportation.

4.8 SITE INSPECTIONS

Tick if you conduct an assessment of whether or not the aquaculture ***activities are occurring within the licensed site*** according to the site map.
OR, in the case of ***freshwater fish***, tick if you have assessed the ***suitability of a site for fish farming*** (eg. silver perch).

4.9 NAV MRK & LGT

Tick if you have conducted an inspection of the required ***navigational marking and lighting*** for the aquaculture site.

4.10 LICENCE CHECK

Tick if you have sighted the ***aquaculture licence*** for the site.

4.11 SPECIES CHECK

Tick if you have determined that the ***species listed on the licence*** are the ones being cultured by the licence holder.

4.12 QUAR/DISEASE

Tick if you are inspecting an aquaculture site for quarantine or disease outbreak purposes.

4.13 WASQAP – ROUT.

Tick if you are supervising industry to undertake ***routine sampling*** of water and shellfish for the WA Shellfish Quality Assurance Program. If the check takes place on a lease site, note down the licence number as normal. If it takes place outside any lease site (eg. collecting water quality samples away from dedicated lease sites) we still need to record something against the licence number – in this case, use the "dummy code" ZA999 to indicate the inspection was not associated with any individual company.

4.14 WASQAP – CLOS.

Tick if you are inspecting a site to ensure ***compliance to a closure of a site*** under the WA Shellfish Quality Assurance Program

4.16 BSTOCK COLLECT

Tick if you are supervising the ***collection of aquaculture broodstock*** being taken under an Exemption.

5 Additional Notes

5.1 FACTORY INSPECTIONS OF COMMERCIAL ROCK LOBSTER CONSIGNMENTS

Factory consignments of RL will continue to be recorded on the usual data sheets. On the Contacts form, please record the Area, factory name (in the space for Location), arrival and departure time, circle P (for processor) and write RL03 in the Fishery Code column; specific details of the check should then be recorded in the usual way on a factory inspection form (refer also to Section 1.2.6.8). For districts that report on commercial checks of rock lobster other than RL03 (eg. Southern Rock Lobster) then Commercial details (i.e. vessel number and catch inspection check box) must be recorded since these inspections would not normally be recorded on Rock Lobster Consignment Inspection forms.

5.2 DIVIDING PATROL GROUPS

The DPC form is designed to be completed by teams of FMOs – this saves everyone having to complete a personal form and makes sense given the nature of patrol duties. This creates a problem, however, if a team splits up part way through a day. If a patrol team splits for more than 30 minutes, a new form must be commenced if one or more of the Officers continue with patrol duties. For example, if one FMO from a 3-person patrol returns to the District Office part-way through the day and the remaining 2 Officers continue with patrol duties, then they must commence a new form.

5.3 OFFICE TIME

Office time should only be recorded on the DPC sheet if FMOs return to the office for part of day between patrol times. The only reason this is done is to avoid having to start a new form when leaving the office to resume the patrol. Record as location Office , Fishery code UNSP.

Commercial quota audits (*not* maintenance of a QMS system) that occur in the office should be recorded as commercial contacts against the appropriate fisheries code, noting the location as Office. Any commercial contacts noted as Office on the Patrol Contacts form will automatically be considered as office-based quota checks, so don't do this if they are not. The rationale here is that a paper-based quota audit is essentially the same as commercial catch check.

5.4 MARINE PARKS

See 1.1.1 Marine Park Patrols

5.5 EXTENSIVE TRAVELLING TIME

FMOs in some parts of the State, particularly the recreational Mobile Patrols) may be required to undertake lengthy journeys – either in vehicles or vessels – prior to commencing patrol duties. In the event that FMOs travel for a full day and providing no patrol activities are conducted, then there is no need to record this on a DPC form.

5.6 DUTIES WITH SOU

Duties undertaken with SOU that occur as part of a patrol are recorded in a special way. FMOs should note down SOU in the Area/Location section of the form (no specific details on the *actual* location should be recorded), the Arrive/Depart time should be noted, as well as the Fishery Code relating to the operation. If more than one FMO from the same office undertake the same SOU duties, then they should be considered a patrol unit and be noted on the same form.

Duties with SOU should only be recorded if the SOU work breaks a normal patrol for a period during the patrol (i.e. in the same way that returning to the office for a time might break the patrol). It is to save FMOs having to fill in another form when the patrol recommences. If you undertake a normal patrol in the morning, but then undertake duties with SOU for the whole of the afternoon, then there is no need to record the afternoon SOU duties – simply sign off the DPC form when the normal patrol finishes.

5.7 COMPLETED FORMS.

DPC Forms: Officers should return the **original, signed** completed DPC forms to Anita Ward at Hillary's.

MSI Forms: Marine Safety Inspection forms must be forwarded to the Marine Operations Centre in Fremantle.

All forms must be submitted once every 10 days. A copy must be kept at the Regional Office and individual FMOs may keep their own copies if they wish.

PART TWO - MARINE SAFETY INSPECTIONS

6 Recreational Vessel Inspections

6.1 AREA

Record the major area of the patrol. Each district has a list of 3 letter codes for predefined areas within districts. A list of Area codes is attached as Appendix B. Note that Area information does not have to be written on each line if you are conducting inspections of numerous vessels in the one area. If you change areas at some time during the patrol, write the new area code on the next line and continue.

6.1.1 Inland Patrols

When FMO devised area lists within each district, some assigned specific codes to refer to inland areas they regularly patrolled. Other districts did not assign inland codes, primarily because patrol work only occasionally occurred away from the coast. In general, if there is no specific inland code associated with an area it is assumed that the patrol is occurring on or very near the coast. If, on occasion, marine safety work takes officers to inland waters, where no specific area code is prescribed for that area then the coastal code should be used with the addition of **– (i)** after the code.

6.2 VESSEL NUMBER

This is the registration number of the vessel that is being inspected and it should be recorded for each inspection. When recording vessel numbers, be mindful that the letters and numbers will be read by someone else and will need to be legible. A list of valid registration numbers is provided below:

1 to ~91150
A001 to A999
AA001 to AA999
AB001 to AB999
AC001 to AC999 and so on
BA to BZ999
CA000 to CA074 (CA075 to CZ999 not used)
DA000 onwards

6.2.1 Unregisterable Vessels

When an inspection is conducted on an unregisterable vessel (vessel not capable of being propelled via mechanical means) the “Vessel Number” column is to be left blank and the “Rego” box ticked. A comment of ‘unregisterable’ in the remarks column is necessary. Apart from that, the inspection should be conducted and recorded as normal.

6.2.2 Interstate Vessels

When an inspection of an interstate vessel occurs the interstate vessel number should be recorded as is in the “Vessel Number” column and the “Rego” box ticked providing the vessel is currently registered in that State. Note that interstate vessels have **90 days** from entry into WA to have the vessel WA registered.

6.2.3 International Vessels

In the event that an FMO inspects an internationally registered vessel, the same recording rules as interstate vessels apply. Note that international vessels have only **30 days** from entry into WA to obtain WA registration.

6.3 CONTACT CODES

Contact Codes are used to define the type of inspection being carried out. The most commonly used contact code is 0 (safety check). Where codes between 1 and 16 are used the only "Rego & Equipment Checks" column that is required to be completed is "Rego".

6.3.1 Speed Checks

Where speed checks are being conducted there is now no need to record the vessel number of each vessel that is speed checked. Simply record the "Area" "Time" and "Contact Code" columns and record the number of vessels that are checked in a tally in the remarks column. Where a vessel is detected speeding then the vessel number should be recorded on the following line and the other details recorded accordingly.

An example: FMOs are conducting speed checks in the Hillary's Boat Harbour. The speeds of 22 vessels are checked with a laser gun. Two vessels are found to be speeding and one of these vessels is also subject to a safety check.

Area	Time 24h	Vessel Number	Contact code	Tick only ONE				Rego & Equipment Checks									Officer notes	
				PV		Land												
				Protected	Unprotected	Launching	Retrieving	Rego	Life Jacket	Flares	Para Flares	Fire Exting	Anchor & Line	Bilge P & Bailer	Radio	EPIRB	Number of people	*Remarks*
MMP	**0600**		**1**	?														**22 speed checks**
	0615	**22222**	**1**	?				?										
	0650	**33333**	**1**	?				?										
	0650	**33333**	**0**	?				?	**?**	**?**	**O**	**O**	**?**	**?**	**?**	**O**		

Only record the rego numbers of offending vessels, but tally the number of other vessels checked

A different line is used for the safety check on the offending vessel

For codes 1-16 only tick Rego

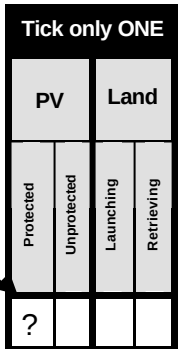
Record speed checks in tally form here

6.3.2 Recreational Fishing Survey

Where FMOs wish to conduct a recreational fishing survey (explained in more detail at section 1.7) but do not wish to conduct an MSI inspection, then a contact code of "17" must be used. Where the code "17" is used, fill in the inspection sheet as per normal, however do not complete any of the "Rego & Equipment Check" columns.

6.4 PATROL VESSEL & LAND BASED INSPECTIONS

Inspections can be broadly classed into two categories – patrol vessel based or land based. PV inspections can be conducted in protected or unprotected waters. Land based inspections can be conducted when the vessel is being launched or retrieved.



If you are conducting a PV patrol tick either the "Protected" or "Unprotected" box depending on the waters in which the inspection takes place. **DO NOT** tick boxes under the land based inspection column as well.

If you are conducting a Land Based patrol you will tick either the "Launch" or "Retrieve" box depending on the inspection type. **DO NOT** tick boxes under the PV based inspection column as well.

6.5 REGO & EQUIPMENT CHECKS

The "Rego & Equipment Checks" section indicates the safety equipment that may be required depending on where the vessel is inspected or where it has been. Where the contact code "0" (Safety Check) is used, each of the columns of the "Rego & Equipment Checks" section must be completed with either a ? (equipment present), **X** (required equipment not present/unserviceable) or **O** (not present but not required).

Contact code	Tick only ONE				Rego & Equipment Checks								
	PV		Land										
	Protected	Unprotected	Launching	Retrieving	Rego	Life Jacket	Flares	Para Flares	Fire Exting	Anchor & Line	Bilge P & Bailer	Radio	EPIRB
0	?				?	?	?	O	O	?	?	?	O
0	?				?	?	?	O	?	?	?	?	O
0	?				?	?	?	?	O	?	?	?	X

When the contact code is '0' then all 'Rego & Equipment Check' boxes must have a ? , **X** or **O** recorded for each piece of equipment.

NOTE: Where a vessel has the equipment listed, regardless of whether they are required to carry it or not, then the equipment must be ticked. For example a dinghy powered by an outboard has a fire extinguisher on board. While the extinguisher is not required, it is still recorded as a tick. This type of data assists with monitoring the levels of safety equipment being carried by vessels regardless of whether they are required to carry it or not. Some other important notes regarding safety equipment are listed below.

6.5.1 Personal Flotation Devices

PFDs must meet certain standards to be acceptable as safety equipment. They must meet the Australian Standard 1512 (which must be printed on the PFD) or it must be on the list of approved list of PFDs as per the DPI list.

6.5.2 Flares

Distress flares for private vessels are not required to be 'in date'. Providing that the flares are in good condition then they are acceptable. Flares with an expiry date of more than 6 years should attract a recommendation that the flares be replaced.

6.5.3 Anchor and Line

The anchor and line must be efficient for all conditions. A Damforth anchor fits within this category. Reef anchors are not considered to be an efficient anchor however can be carried as secondary anchors if so desired.

6.5.4 EPIRBs

EPIRBs must have an 'in-date' battery if they are to be considered to be in a serviceable condition.

6.6 OFFICER NOTES

The "Officer Notes" section consists of two parts, the "Number of People" and "Remarks" columns. Data entered into this section is not compulsory and will not be recorded into the database unless it is of significance e.g. a tally of vessels checked for speeding. The "Number of People" column has been provided for those FMOs who find that it assists them when determining contact numbers to put on the Daily Patrol Contacts (DPC) form.

6.7 RECREATIONAL FISHING SURVEY

As a part of the Integrated Fisheries Management (IFM) process there is a need to record the catches of certain species of fish that are to be used as indicator species. The species are specific to each of the four bioregions. Consequently, there are now four versions of the MSI forms that are bioregion specific.

The survey is seeking to know how many of the indicator species are being taken by recreational fishers. It is expected that a survey is conducted whenever a marine safety contact (be it a safety check, navigation lights, no rego sticker etc) is recorded on the MSI form. All that will be required is to record the following:

- Whether the person has been fishing/is fishing (**Y**); will be fishing (**W**); or will not/has not been fishing (**N**) by circling the appropriate letter; and
- The number of fish indicator species taken by recording the number in the corresponding column for that species.

Where a safety check is not conducted but a FMO wishes to complete a recreational fishing survey, then the contact code of 17 should be used and the MSI form should be completed as described in section 1.3.2.

With high volume species such as crabs, herring etc. there is no need to individually count each of the fish to provide a precise number for the survey. That said, if a fisher looks to have close to their bag limit then FMOs will still be expected to count the fish as per normal practice. In other cases, just ask the fisher how many they have caught, as more often than not they know how many fish they have taken within 1 or 2 fish. See an example of a completed recreational fishing survey on the next page.

Recreational Marine Safety Inspections
Last modified: 5/05/2005

District: Exmouth | **Date:** 01 / 07 / 05

FMO: Steve Wall, Dean Clarke | **Page** 1 **of** 1

Completed *original* forms must be sent to; MOC - PO Box 496, Fremantle WA 6959.

Contact Codes:
0 = Safety check
1 = Speed Checks
2 = Out of ski area
3 = No rego sticker
4 = No rego
5 = Age of driver/obser.
6 = Tied to nav mark
7 = 45 m offshore
8 = Obstr. channel
9 = Poor navigation
10 = Mooring problem
11 = Tow/assist
12 = General skiing
13 = General queries
14 = Other
15 = PWC
16 = Nav. Lights
17 = Rec Survey Only

Equipment Checks:
Tick = correct/present
X = incorrect/absent
O = not required (or exempt)

Rec Survey Notes; Species Codes (GASCOYNE BIOREGION):
Y – has been fishing; **W** – will be fishing **N** – will not/has not fished
SE – Spangled Emperor; **BS** – Black Snapper; **BG** – Baldchin Groper; **SM** – Spanish Mackerel; **PS** – Pink Snapper; **TA** – Tailor; **YB** – Yellowfin Bream; **RE** – Redthroat Emperor

Eg. Y W N | 3 | 1 |

Area	Time 24h	Vessel Number	Contact code	Tick only ONE: PV Protected	PV Unprotected	Land Launching	Land Retrieving	Rego & Equipment Checks: Rego	Life Jacket	Flares	Para Flares	Fire Exting	Anchor & Line	Bilge & Bailer	Radio	EPIRB	Officer notes: # of people	Remarks	Rec. Fishing Survey: Fishing?	SE	BS	BG	SM	PS	TA	YB	RE
EXG	1800	11111	0			?		?	?	?	O	O	?	?	O	O			W								
	1820	AZ444	16				?	?											Y								
	1825	AA007	17				?												Y	2			1				
	1835	BA555	16				?	?											N								

REMEMBER- Contact codes 1 to 16 only requires 'rego' box to be completed

No 'Rego & Equipment Check' boxes ticked for code 17

This person went fishing but didn't catch any of the listed species.

Number of indicator species taken i.e. 2 Spangled Emperor and 1 Spanish Mackerel

7 Commercial Vessel Inspections

Inspections that take place on board both surveyed and survey exempt vessels must be recorded on a Commercial Marine Safety Inspection (CMSI) form. A commercial safety inspection can take three main forms: i) manning check; ii) part survey check; or iii) full survey check. Examples of what is required to be completed for each type of check can be found overleaf. Please note that regardless of the type of check completed the details of the check must be recorded in the vessels log book (including the name of the FMO).

7.1 SAFETY MANNING CHECKS

Safety manning checks require the following details to be recorded on the CMSI form. These checks are designed to ensure that the vessel is operating with the required number of crew and that there are suitably qualified persons on board to fulfill the survey requirements. All of the form with the exception of the "Equipment Checks" column must be completed for manning check. Note that "Vessel and Certificate Details" are required for a safety manning check. Some components of the safety manning check have been described below to assist FMOs.

7.1.1 Vessel Number

The vessel number can be recorded as either the LFB, SPV or M&H number of the vessel. Please note that survey exempt vessels will have the following registration numbers: 99001 to 99999; or C001 onwards. With regard to "C" registered survey exempt vessels, please ensure that when the registration number is recorded it is clear that it is a survey exempt vessel and not a LFB prefix and number. A brief comment to that effect should be recorded so that the correct 'type' of registration number can be recorded.

7.1.2 Qualifications

This requires the details of certificates of competency to be recorded eg. MC5; MED1. If other people on board have qualifications it is a good idea to record them as well just in case there is a problem with the Master's or Engineer's qualifications. Please note that is the responsibility of the FMO conducting the inspection to verify the safety manning check at the time or as soon as possible thereafter. This can be done by phoning Jean Birch at DPI on 9216 8238.

7.2 PART SURVEY CHECKS

A part survey check always includes a safety manning check (for details see section 2.1) therefore it is only necessary to tick the "Part Survey Only" box. In addition to the safety manning check, six items from the "Equipment Checks" column must be inspected. Each piece of equipment selected to be inspected should be ticked as either **Y** (present and operational), **N** (not present/unserviceable) or **N/A** (indicates not applicable or exempt).

7.3 FULL SURVEY CHECKS

Like the part survey check, the full survey check also includes a safety manning check. Full survey checks require all of the "Equipment Checks" items to be checked. Please ensure that all of the "Equipment Checks" items are completed on the form otherwise the inspection can only be recorded as a part survey check. Check that the form is complete prior to leaving the vessel.

Commercial Marine Safety Inspections
Last modified: 5/05/2005

Completed *original* forms must be sent to; MOC - PO Box 496, Fremantle WA 6959.

District:				FMO:	
Area:	Inspection Date / /	Time (24hr) :	Vessel Nbr:		Vessel Name
Master Name: (full name required)			1.6	D.O.	
1.8		State of Issue QLD ☐ NT ☐ VIC ☐ WA ☐ AMSA ☐ SA ☐ NSW ☐ TAS ☐	Verified:		
Address:					
		Phone:	1.9		
Engineer Name: ☐ tick if same as master			1.10	D.O.B.	
1.11		State of Issue QLD ☐ NT ☐ VIC ☐ WA ☐ AMSA ☐ SA ☐ NSW ☐ TAS ☐	Verified:		
Address:					
		Phone:	1.12		
Owner Name: ☐ tick if same as master		Phone:	1.13		
Address:					

Vessel & Certificate Details		Survey Certificate Carried? ☐Yes ☐No ☐Exempt		MA5? ☐Y ☐N Nbr:		Vessel Classes / /	
Length m	Manning Only					Crew Nbrs	
Engine KW	Part Survey?						

Notes (crew training, safety equipment, etc).

shaded area for **Manning Check** only

plus six (6) items from shaded area for **Part Survey**

Both and areas complete for **Full Survey**

Officer In Charge: (print full name)

Equipment Checks (any 6 = a part survey)	Tick one Y	N	NA
Logbook			
Compass card			
Compass			
Clock/barometer			
Radio(s)			
Compass			
Call sign(s)			
Life jackets			
Flares/pyrotechnics			
Medical kit			
EPIRB			
Torch			
Bilge alarm			
Bilge pump			
Freeze alarm			
Navigation lights			
Fire extinguishers			
Fire buckets			
Freeing ports clear			
Weather deck hatches			
Escapes clear			
Guardrails in good order			
Anchors			
Liferaft (free floating)			
Lifebouys (light/line)			

8 Hire and Drive (H&D) Vessel Inspections

Inspections of hire and drive vessels should be recorded on the recreational MSI form, not the CMSI form. Please note some points that should be remembered when completing hire and drive inspections:

- H&D vessels are restricted to operating during daylight hours only (unless otherwise stipulated)
- When operating offshore H&D vessels require 2 rocket, 2 hand held red and 2 hand held orange flares, all of which **must be in date**
- All powered H&D vessels must carry an in date fire extinguisher (min 2.1kg dry powder; 4.5kg CO_2; or 9L foam)
- PFDs and buoyancy aids are to be marked with the H&D vessel number and may be required to be worn (as a condition)
- A Marine radio & EPIRB are required if surveyed for more than 1 nautical mile offshore in open waters
- A first aid kit (less than scale "G") is required that includes aspirin, bandages, antiseptic cream, cotton swabs and a triangular bandage)
- Bilge pumps- **not** required if there is a sealed deck, there are no hull penetrations **and** foam buoyancy is fitted in accordance with the USL code (**please record as a tick on the MSI sheet –** unless the vessel has failed that component of the inspection)
    - if the deck is sealed (without features above) a bilge pump is required; or
    - in all other cases a bucket or bailer is required
- The hirer should have a copy of the H&D contract, however they are not required to carry it on board the vessel

The operating limits of the vessels can be found on the individual H&D licenses. Should this information be required, contact Norm Snashall (DPI) on 9239 2409.

8.1 CONTACTS

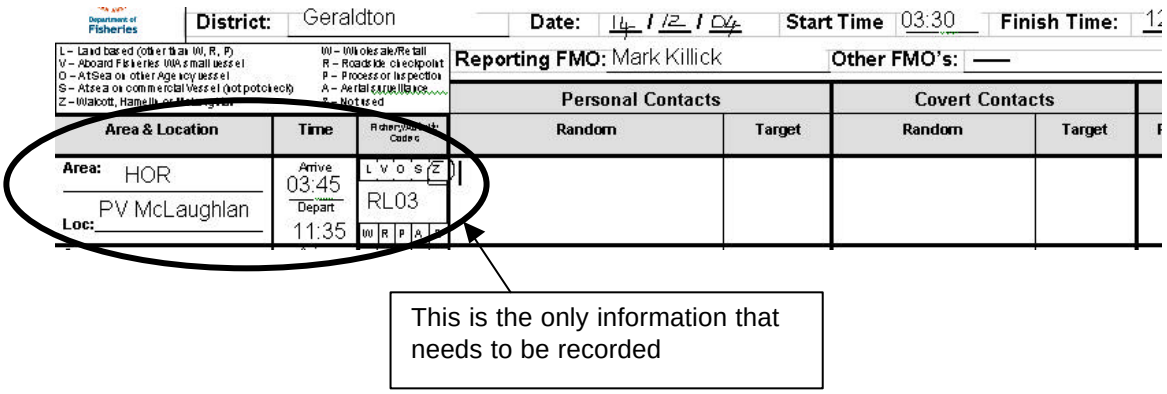
MOC	9239 2400
DPI Switch	9216 8999
Frank Jarosek (DPI) (Manager Comm Vessel Safety)	9216 8243
Jean Birch (DPI- Examinations)	9216 8238
Surveys (DPI)	9216 8239
Norm Snashall (HD Vessels)	9239 2409
Paul Nicholson (DPI Prosecutions)	9239 2417
Mick Currie (Flagship)	9335 6800 0417 946 974

PART THREE - FAQs

9 Frequently Asked Questions & Further Examples

9.1 HOW DO I RECORD POT CHECKS DONE IN CONJUNCTION WITH A LARGE PATROL VESSEL?

Where a land based FMO is participates in a formal pot check carried out in conjunction with one of the large PV's the responsibility of recording the contact details etc lies with the PV. The FMO on board the fishing vessel simply records the Area code in which they are operating and in the 'Location' section the name of the PV is recorded. Then all that is required is for the fishery code to be entered and the activity code 'Z' to be circled. No other details are required, as the PV will record them in their database. See example below:

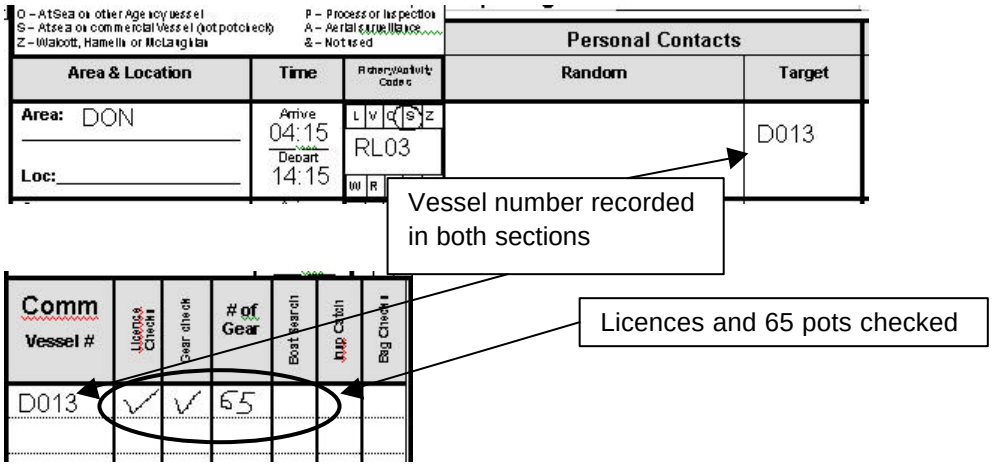


9.2 DO I HAVE TO RECORD FISHERIES CONTACTS ON THE DPC FORM WHEN I AM RECORDING THE NUMBER OF PEOPLE ON BOARD A BOAT ON THE MSI FORM?

This is a definite YES. It is critical that all contacts obtained are recorded on the DPC form. Where the vessels you are inspecting fall under a particular, or multiple, fishery category/ies then record them on the DPC form using the appropriate fishery code. Where a vessel that is not fishing is inspected use the fishery code R-NFV (Recreational Non-Fishing Vessel).

9.3 HOW DO I RECORD THAT I HAVE BEEN TO SEA ON BOARD A COMMERCIAL VESSEL FOR THE DAY (NOT A FORMAL POT CHECK)?

Where a FMO goes to sea on-board a commercial vessel the DPC form should be completed as normal, with the activity code 'S' circled. Where the gear of the vessel is checked (not a formal pot check though) then the amount of gear should be recorded against the vessel number in the bottom half of the DPC form. Simply tick the 'Gear Check' box and write in the amount of gear inspected. See example below for a rock lobster vessel:



9.4 HOW DO I RECORD CONTACTS OBTAINED DURING WHOLESALE RETAIL INSPECTIONS?

A wholesale retail contact should only be recorded on a per outlet basis e.g. 10 restaurants are checked during a day. This would be recorded as 10 Personal Contacts adjacent to the particular Fishery Code i.e. one contact per premises. If a check of a wholesale/retail check of a premises that sells a variety of fish products is conducted then the unspecified fishery code (UNSP) should be used.

9.5 DO I HAVE TO RECORD MSI INFORMATION ON THE DPC FORM?

No. The MSI and DPC forms now operate separately. Each form records the information required and they are entered into separate databases. No need to cross-reference forms with each other.

9.6 WHAT IS THE DIFFERENCE BETWEEN THE DPC SYSTEM AND AXIOM?

The DPC system and Axiom are two separate systems and should not be confused. Both are necessary and unfortunately it is not possible to combine them. Axiom is a system to record time against projects for the purpose of cost allocation and is particularly important for correctly charging cost-recovered fisheries. The DPC system records field contacts against fisheries and activities, regardless of how the time is charged. Note that there is no need to record contacts in Axiom, but *you are still required to record your time allocation in Axiom*.

9.7 WHAT IS THE DIFFERENCE BETWEEN FISHERY CODES UNSP AND R-OT?

UNSP stands for unspecific fishery activity, and should be used when activities are undertaken that service a whole range of fisheries simultaneously. For example, if you are manning a DoF booth at a boat show and talk to a range of fishers (from many different fisheries) and non-fishers, then record the contacts against fishery code UNSP. Similarly, if you do some Wholesale/Retail checks of outlets that sell a range of fish products, use fishery code UNSP.

R-OT is a recreational fishery code that should be used for work undertaken in any recreational fisheries that do not have their own, specific fishery code. For example, if you do a check of someone catching gilgies or cherabin, then use fishery code R-OT.

9.8 WHY ARE THERE TWO VERSIONS OF THE DPC FORM – ONE WITH AQUACULTURE CHECKS AND ONE WITHOUT?

There are two versions of the DPC form for your efficiency (believe it or not). Since on most patrols you will know beforehand that you will be doing an aquaculture check, just take the aquaculture form out on those patrols. It will save filling out more forms than necessary.

9.9 WHAT DO I DO WITH A COMMERCIAL CONTACT WHEN I DON'T KNOW THE VESSEL NUMBER?

If you don't know the vessel number and can't find it out, record the commercial contact in tally form. Please endeavor to find out and record the LFB number wherever possible.

9.10 DO I NEED TO RECORD CARS AND TRAILERS AS CONTACTS WHEN NO FISHERS ARE PRESENT?

In short, no. See explanation at 1.1.3.

9.11 HOW DO I RECORD CONTACTS OBTAINED THROUGH AERIAL SURVEILLANCE?

From a small aircraft, two FMOs undertake aerial surveillance of rock lobster boats around the Southern boundary of the Abrolhos Islands. They observed 22 commercial vessels (one of which was a "target"). Only 6 of the LFB numbers were visible so the remainder of contacts were recorded in tally form. Additionally, no details need to be recorded in the lower (Commercial) part of the DPC form as they are all covert contacts.

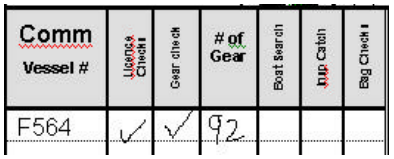
O – At Sea on other Agency vessel
S – At sea on commercial vessel (not pot check)
Z – Walcott, Hamelin or McLaughlan
P – Process or Inspection
A – Aerial surveillance
& – Not used

Area & Location	Time	Fishery Activity Codes	Personal Contacts		Covert Contacts	
			Random	Target	Random	Target
Area: AIS Loc: Sthn Boundary	Arrive 07:00 Depart 08:15	L V O S Z RL03 W R P A &			G084; D056; G236; F567; D192	D103

Note that gear sightings (counts of gear) from the air are not recorded, but if you flying over unattended gear you should try and ***estimate*** the number of vessels present in an area by the amount of gear and the float colours – write your estimate in the unattended gear column. That is, the Unattended Gear column refers to an estimate of vessel numbers (from unattended gear sightings) when the activity is aerial surveillance. In this example there were vessels in the vicinity of all gear sighted so no estimates were made.

9.12 HOW DO I RECORD A POT CHECK FROM A DOF SMALL VESSEL

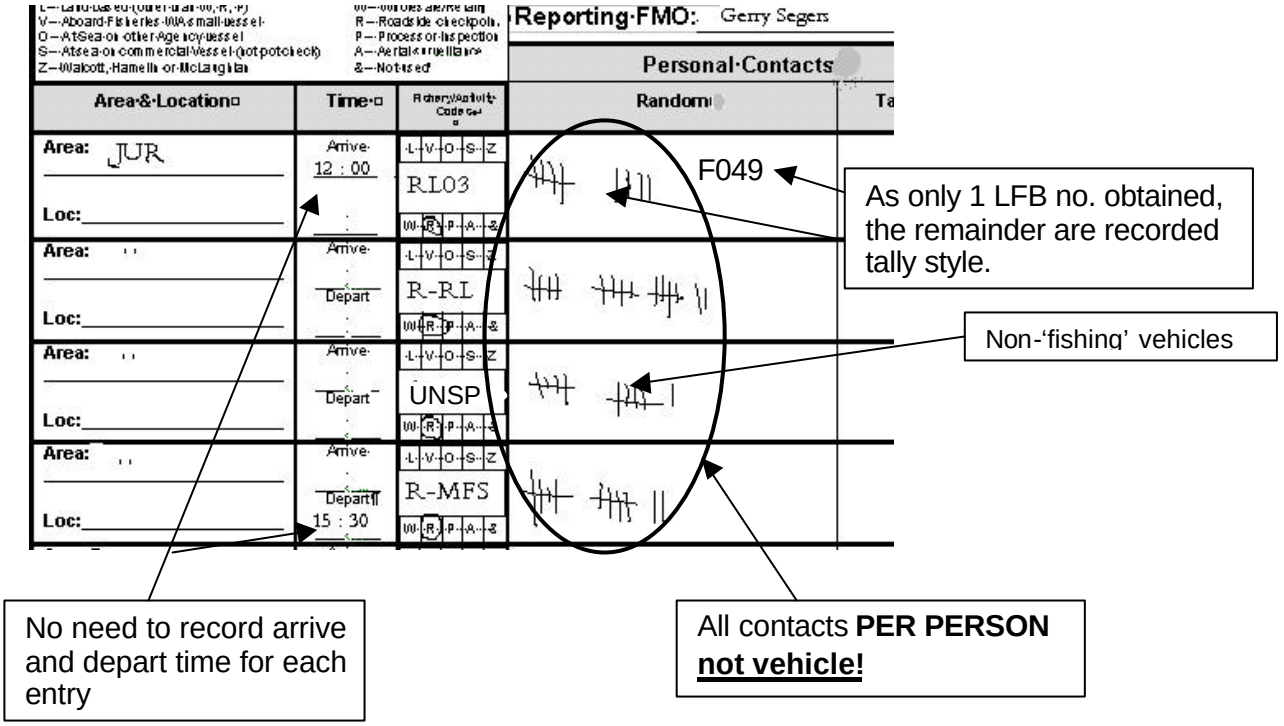
From a DoF small vessel, three FMO's conduct a targeted formal pot check of a commercial fisher; two of the Officers worked from the Fisheries vessel, while the other travels aboard the commercial vessel.



A few things to note: All three FMOs involved in the operation should be recorded in the Header Information section on the same form. The vessel had a quota of 92 pots, all of which were counted and checked. Licence checks were also conducted. If the small vessel is assisting one of the large PVs then the same rules as the pot check involving a large PV apply i.e. Area recorded as normal, location e.g. Hamelin, only the activity code would be 'V' and no contact details would be recorded.

9.13 ROADSIDE CHECKPOINTS.

A roadside checkpoint is conducted at Cervantes. 35 vehicles, containing a total of 49 people, pass through the checkpoint. Some of these people have not been fishing that morning and others have been fishing. Four different fisheries are represented.



It is important to note that all people checked are recorded as personal contacts as a FMO power is being exercised upon them i.e. stop & search. Remember that if a fisher has been fishing in more than one fishery, then they are recorded as a contact against every fishery in which they have participated. For example, if you stop a car with someone who has been recreational rock lobster fishing and line fishing, then this person would be tallied against rock lobster *and* line fishing. Note that there is

no need to record the arrival and departure time for each fishery as the contacts are obtained in the same area across different fisheries during the same period.

9.14 HOW DO I RECORD INSPECTIONS CONDUCTED FROM A DOF SMALL VESSEL WHEN THIS VESSEL IS BEING OPERATED FROM A LARGE PV (MOTHERSHIP)?

Often FMOs may tow their district small PV behind a large PV during an extended at sea patrol. The small PV is then used quite independently of the large PV during patrols and the large PV essentially acts as a mothership. This is particularly the case in the northern region. The contacts obtained as a result of using the small PV should be recorded by the FMOs involved on a DPC form. The data should not be entered into the PV database system.

PART 4 - PEARLING

10 Pearling Daily Patrol Contacts

The pearling industry is the second largest cost-recovery fishery, and it is necessary that we begin to collect information about these inspections. This has been accomplished by minor modifications, principally to the commercial checks part, of the FODPC form to create the Pearling Officers Daily Patrol Contacts (PODPC) form. With the introduction of pearling checks there are now three versions of the DPC form:

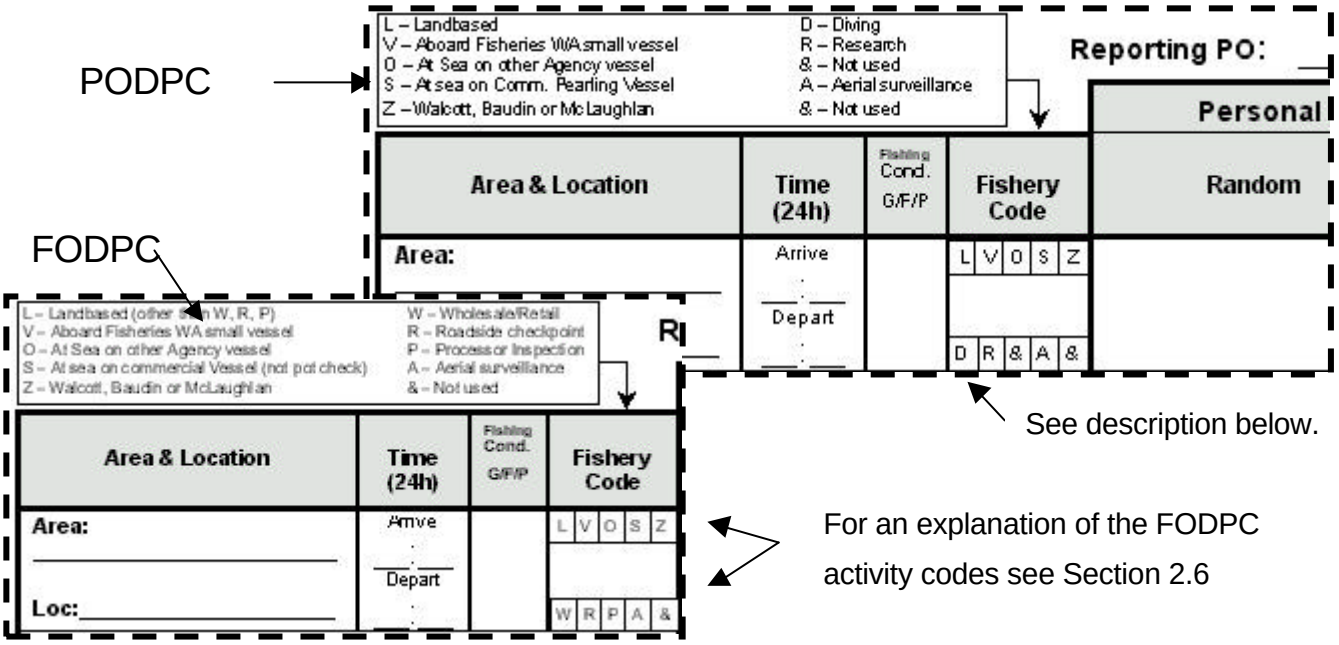
i) One version is exclusively for recreational/commercial work, and allows 12 commercial vessel checks to be recorded on a single side of the form.

ii) A second version is similar to i) above, but additionally allows up to 6 aquaculture checks to be recorded.

iii) The third version is pearling specific and allows for six hatchery and six wildstock pearling checks per form.

10.1 ACTIVITY CODES

The activity codes on the FODPC form have been modified to accommodate pearling related activities. Six of the activity codes on the PODPC have remained the same as the FODPC form, but their interpretation may have slightly altered. Two new activity codes have been introduced. A comparison between the PODPC and FODPC form is provided below, along with an explanation of when to use each of the PODPC activity codes.



10.1.1 R – Research (Pearling Only)

Circling R indicates regional services work being undertaken within the pearling industry on behalf of or in conjunction with the Departments Research program. Indicate this activity for **any** pearling research, regardless of what you may be doing (ie. independent of whether you are undertaking land-based or sea-based activity, diving, etc).

10.1.2 D – Diving Inspections (Pearling Only).

Circling D if conducting diving inspections, with an individual diving operation recorded as a single contact. If a pearl dump or holding site holds pearl oysters of more than one pearl licensee additional entries need to be made at the bottom of the form recording the details of each licensee inspected.

10.1.3 O – At sea on Other Agency Vessel

The activity code O is usually circled when conducting work from vessels maintained by other agencies (e.g. CALM, police, customs, etc). In pearling compliance, sometimes Officers will operate from charter vessels – for example, if the PV Walcott is out of action for some reason. If this is the case, record the activity as O to indicate you are operating from a vessel not owned by the agency.

10.1.4 All Other Codes: L/V/S/Z/A/&

All other activity codes have the same interpretation as described in Section 2.6, with the exception of those codes that are "over-ridden" through the use of either D or R. For example, if you are aboard the Walcott conducting dive inspections of leases, you would circle D since this takes precedence over Z. Normally, all pearling compliance work is recorded by the Pearling Officers, not the patrol boat skipper or crew (i.e. if conducting pearling work, officers should never have to use activity code Z!)

10.2 DISTRICT / AREA / LOCATION INFORMATION

Record the "District" and major area of the compliance work. There are 5 districts for the purposes of the PODPC system. Each zone of the fishery has been designated the status of "district" within the DeePCee database, and each district has a list of 3 letter codes for predefined areas within districts. Area codes were developed by Greg Finlay, so please first consult with Greg if you wish to modify or add area codes. The list of pearling districts and area codes is attached as Appendix C.

Pearling patrols should record the exact Location of the check or inspection taking place; an example of this is 80 Mile Beach, 26 Mile fishing patch or King Sound, Cone Bay lease sites.

While Location is optional for the FODPC system, it is <u>compulsory for the pearling patrols</u>.

10.3 RANDOM AND TARGETED CONTACT TYPES

In the top section of the form, pearling inspection work would normally be recorded as random personal contacts. Only record something as targeted when we have prior information to suggest someone is doing the wrong thing and the inspection is purposefully carried out as a result of that information. In other words, if a District has an operational plan to inspect lease sites A & B, then these are not targeted contacts, they are simply inspections conducted as part of plan of what will be done before setting out. If information is received about site C to suggest they are doing the wrong thing, and site C is *inspected because of this information*, then inspecting C would constitute a targeted contact.

10.4 FISHERY CODES

The usual two Axiom fishery codes are to be used, namely PN52 (Wildstock Compliance) and PN53 (Hatchery Compliance).

10.5 CHECKS OF PEARLING OPERATIONS

The lower part of the PODPC form is used to record checks of individual pearling operations. It consists of a checkbox system similar to that used for aquaculture checks. The pearling specific form is divided into two specific areas, Wildstock and Hatchery. You will note that the checks differ from one to the other, so officers need to differentiate between both when marking these forms. Explanations of each of the fields and checkboxes are provided below.

10.5.1 W/Stk – Pearling Wildstock Fishery

- VESSEL Nbr

Record the licence number of the pearling vessel checked. This should also be used to record the identification number of any aircraft or vehicles checked.

- LIAISON ONLY

Tick if the contact was for liaison only, such as a meeting or discussion with a farm manager, fleet master or licensee agent. If you check this box, there should be no other information recorded other than licensee code and number of people contacted.

- COVERT ONLY

Mark this checkbox if you covertly observed a pearling wildstock operation. For covert contacts in other commercial fisheries, if you check this box there should normally be no other information recorded in the bottom section of the form other than the vessel number. For pearling inspections, however, it is possible to conduct other types of inspections as part of a covert contact (e.g. if no-one is physically at the site at the time of the inspection).

- LICENSEE CODE

This field should be used to record the two-letter pearling licensee identification code assigned by the Department (i.e. BP = Broome Pearls Pty Ltd). ***See Appendix D for a complete list of licensee codes.*** If a licensee does not have a code within the existing list (e.g. a new operator) please contact Anita Ward to advise a new code is required. In the event that a licence number is pending but not yet issued, use the "dummy code" **LP** (for licence pending).

- LICENCE CHECKS

Denote specific licence checks by marking the appropriate tick-boxes:
Mb – Pearl Boat licence for the pearling catcher/operations (mother) boat
Dp – Pearl boat licence for the pearl dump boat
PBM – Pearl boat masters licence
PDL – Pearl divers licence

- QUOTA CHECK

Denote specific wildstock checks by marking the appropriate tick-boxes:
Form – Completion and submission of Notice of Pearling or Hatchery Activity.
Tags – Allocation and attachment of wildstock pearl oyster quota tags
Logbooks - Completion of wildstock quota logbooks

- NBR OYSTERS

This checkbox applies to number of pearl oyster checked for each inspection, this includes the number checked on board a vessel or inspected on a dump.

- DUMP CHECK

Tick if you have conducted an inspection of a pearl oyster dump.

- ABOARD AT SEA

Tick if you have accompanied a pearling vessel to sea for a pearling wildstock fishing, transport or operations trip.

- TRANSPORT INSPECTION

Tick if you have undertaken an inspection of the transport of wildstock pearl oysters; this includes farm stock (i.e. untagged shell).

- BD / NAV MRK & LGT

Tick if you have conducted a boundary inspection of the required navigational marking and lighting for the pearling farm.

- OPERATIONS INSPECTION

Tick if you have undertaken an inspection of wildstock pearling operations, farm stock re-operations or harvest.

- OFFENCE

Tick the appropriate box if you issue a written warning, infringement warning, infringement notice, or prosecution brief.

10.5.2 Hatch – Hatchery Pearling Checks

- LICENSEE CODE

This check box should be used to record the pearling hatchery licensee identification code, which has been assigned to pearling licenses by the Department (i.e. BP = Broome Pearls Pty Ltd). See Appendix D for a full list of codes.

- LIAISON ONLY

Tick if the contact was for liaison only, such as a meeting or discussion with a hatchery manager, farm manager, fleet master or licensee agent. If you check this box, there should be no other information recorded other than licensee code and number of people contacted.

- COVERT ONLY

Mark this checkbox if you covertly observed a pearl hatchery operation.

- NBR PEOPLE

Record the number of people contacted during the check.

- NURSERY INSPECTION

Tick this box if you have undertaken an inspection of a pearling licensees pearl farm hatchery nursery site.

- HATCHERY INSPECTION

Tick this box if you have undertaken an inspection of a pearl oyster hatchery.

- QUARANTINE INSPECTION

Tick this box if you have undertaken an inspection of a pearl oyster quarantine site.

- TRANSPORT INSPECTION

Tick if you have undertaken an inspection of the transport of hatchery-produced pearl oysters.

- Bd / NAV MRK & LGT

Tick if you have conducted an inspection of the required navigational marking and lighting for the pearling nursery site or the nursery site area markings/coordinates.

- NURSERY AUDIT

Tick if you have undertaken an audit of a licensee's pearl oyster nursery site.

- SPECIES CHECK

Tick if you have undertaken an inspection of the pearl oyster species located on a licensee's pearl oyster nursery site.

- NBR OYSTERS

This checkbox applies to number of pearl oyster checked for each inspection, including the number checked on board a vessel or inspected on a nursery site or hatchery.

- DISEASE

Tick if you have undertaken an inspection of hatchery-produced pearl oysters for disease outbreak or sampling of oysters for certificate of health clearance.

- QUOTA

Denote specific hatchery checks by marking the appropriate tick-boxes:
Tags – Allocation and attachment of hatchery pearl oyster quota tags
Logbooks - Completion of hatchery quota logbooks

- BROODSTOCK COLLECTION

Tick this box if you have undertaken an inspection of pearl oysters being taken, utilised or transported as broodstock pearl oysters.

- OPERATIONS INSPECTION

Tick this box if you have undertaken an inspection of hatchery produced pearl oyster operations, re-operations or harvest.

- STOCKING REPORT

Tick this box if you have undertaken an inspection of a nursery site to verify the accuracy of quarterly stocking reports submitted.

- OFFENCE

Tick the appropriate box if you issue a written warning, infringement warning, infringement notice or prosecution brief.

Appendix A – Fishery Codes

COMMERCIAL	FISHERY CODE
Abalone	
Greenlip & Brownlip	**AB03**
Roes abalone	**AB04**
Beach Based (beach seine etc)	
Australian Salmon (South West)	**SH04**
Australian Salmon (South Coast)	**SH05**
Exmouth Gulf Beach Seine	**GA04**
Herring trap fishery	**SH06**
Shark Bay Beach Seine	**GA05**
South West Beach Seine	**SH09**
Charter	
Extractive Fishing Charters or Tours	**R-CHE**
Non-Extractive Fishing Charters or Tours	**R-CHN**
Commercial Other	
Commercial other Gascoyne	**GA02**
Commercial other Metro	**ME02**
Commercial other Mid-West	**MW02**
Compliance other North	**NH02**
Compliance other South	**SH02**
Compliance other Statewide	**SW02**
Crab	
Comet Bay Crab	**ME04**
Shark Bay/Carnarvon Crab	**GA07**
Estuarine	
South Coast Estuarine	**SCE**
West Coast Estuarine (old Mandurah Estuarine)	**WCE**
Purse Seine	
South Coast Purse Seine	**SCPS**
Rock Lobster	
West Coast Rock Lobster	**RL03**
Scalefish	
Lake Argyle Catfish	**NH07**
Northern Demersal Scalefish	**ND03**
Shark Bay Snapper	**SN02**
Shark	
JA Northern Shark	**JAN**
JA Southern Gillnet & Longline	**JAS (old SDL)**
West Coast Gillnet & Longline	**WCS**

WA North Coast Shark	**NCS**
Trawl	
Abrolhos Island Trawl	**MT06**
Broome Prawn	**MT08**
Exmouth Gulf Prawn	**EP03**
Kimberley Prawn	**MT02**
Nickol Bay Prawn	**MT09**
Onslow Prawn	**MT10**
Other Minor Trawl	**MT12**
Pilbara Trawl	**PT02**
Shark Bay Prawn	**SP03**
Shark Bay Scallop	**SS03**
South Coast Trawl	**SH02**
South West Trawl (old CBT)	**MT04 (old CBT)**
Miscellaneous	
Shark Bay Bech-de-mer	**GA06**
Specimen Shell	**SS99**

AQUACULTURE	**FISHERY CODE**
Abalone (growout)	**AB40G**
Abalone (hatchery)	**AB40H**
Aquarium fish	**AF42**
Aquaculture other	**AQOT**
Aquaculture Licence Pending	**AQP**
Barramundi	**BA42**
Crustaceans	**CR42**
Freshwater fish (growout)	**FF40G**
Freshwater fish (hatchery)	**FF40H**
Marron	**MA42**
Marine Finfish (growout)	**MF40G**
Marine Finfish (hatchery)	**MF40H**
Metro Misc.	**MAM**
Mussels (growout)	**MU40G**
Mussels (hatchery)	**MU40H**
Mussels other	**MU42**
Midwest Misc.	**MWAC**
Non-maxima pearls (growout)	**PN40G**
Non-maxima pearls (hatchery)	**PN40H**
Pearling Wildstock (Maxima)	**PN52**
Pearling Hatchery (Maxima)	**PN53**
Redclaw	**RC42**
Yabbies	**YA42**

RECREATIONAL	**FISHERY CODE**
Abalone	**R-AB**
Crabs	**R-CB**

Cockles & Mussels	**R-CM**
Freshwater Fish	**R-FF**
Marron	**R-MA**
Marine Finfish (boat)	**R-MFB**
Marine Finfish (shore)	**R-MFS**
Net Fishing	**R-NET**
Other (all non-specified rec fisheries)	**R-OT**
Prawns	**R-PR**
Rock Lobster	**R-RL**

UNLICENSED COMMERCIAL	**FISHERY CODE**
Abalone	**R-AB(U)**
Crabs	**R-CB(U)**
Marron	**R-MA(U)**
Marine Finfish (Boat)	**R-MFB(U)**
Marine Finfish (Shore)	**R-MFS(U)**
Net Fishing	**R-NET(U)**
Commercial Other	**R-OT(U)**
Prawns	**R-PR(U)**
Rock Lobster	**R-RL(U)**

OTHER	**FISHERY CODE**
Fish Habitat Protection	**FHP**
Fish Kill	**FK**
Meal Break	**MEAL**
No Evidence of Fishing	**NEF**
Non State Fishery	**NSF**
Possible Evidence of Fishing	**PEF**
Aboriginal Fishing Strategy	**PP76**
Shark Patrols	**S-SHK**
Unspecific fishery activity	**UNSP**

Appendix B – Area Codes

GASCOYNE REGION

CARNARVON	Area Code	Description
	BDI	Bernier, Dorre & Koks Is and waters from Nthn tip of Koks Is south to Cape Inscription
	BUB	Greenough Pt to nthn tip Dorre Is (~25°S)
	CNV	Nthn tip Dorre Is (~25°) to Pelican Hill
	QUS	Pelican Hill to Red Bluff (but does not include Red Bluff – is ARB: Exmouth)

DENHAM	Area Code	Description
	GLA	Petit Pt line to Greenough Pt
	HAM	From the vermin fence north to Petit Pt line (which extends east to the mainland) and south west along the main road to the intersection with the Useless Loop rd, then along a line drawn directly east of this point
	EGN	Eastern Gulf north of the Petit Pt (incl. L'haridon Bight) north to the line drawn from the sthn tip of Dorre Is. to the mainland
	FRE	From a line extending West from vermin fence to the Useless Loop Rd to the main rd and then north along this road to the vermin fence
	PEP	Peron Peninsula north of the vermin fence
	DSD	Denham sound extending north to the sthn tip of Dorre Is. and east to a line running due north form Cape Peron
	DHI	All of Dirk Hartog Island extending west from Cape Inscription to the north and Steep Pt to the south
	EDL	From Steep Pt to the Zydorp wreck (incl. land area)
Sanctuary Zones	SSZ	Sandy Point SZ
	SFSZ	Surf Point SZ
	MASZ	Mary Anne SZ
	ESZ	18 Mile SZ
	BLSZ	Big Lagoon SZ
	GWSZ	Gudrun Wreck SZ
	LBSZ	L'Haridon Bight SZ
	DRSZ	Disappointment Reach SZ

EXMOUTH	Area Code	Description
	EXG	Ashburton River to Ningaloo MP boundary
	NTW	Ningaloo MP boundary to Tantabiddi Well
	TCR	Tantabiddi Well to Cape Range sthn boundary
	CRN	Cape Range sthn Boundary to Ningaloo sthn boundary
	NAP	Ningaloo sthn boundary to Amherst Point

Sanctuary Zones	ARB	Amherst Point to Red Bluff (includes Red Bluff)
	CWS	Commercial waters
	ISL	Muiron & Sunday Islands conservation areas
	BISZ	Bundegi SZ
	MTSZ	Murat SZ
	LBSZ	Lighthouse Bay SZ
	JSZ	Jurabi SZ
	TISZ	Tantabiddi SZ
	MSZ	Mangrove SZ
	LSZ	Lakeside SZ
	MUSZ	Mandu SZ
	OSZ	Osprey SZ
	WSZ	Winderabandi SZ
	CSZ	Cloates SZ
	BSZ	Bateman SZ
	MDSZ	Maud SZ
	PSZ	Pelican SZ
	FSZ	Cape Farquhar SZ
	GSZ	Gnarraloo Bay SZ
	TMSZ	3 Mile SZ
	TSSZ	Turtles SZ

METROPOLITAN REGION

FREMANTLE	**Area Code**	**Description**
	PER	Becher Point to James Point
	SMP	Shoalwater Marine Park
	STH	James Point to North Mole
	GIS	Garden Island
	ROT	Rottnest Island
	HIL	North Mole to Mullaloo Point
	CPA	Cottesloe Fish Habitat Protection Area
	MMP	Marmion Marine Park
	WAT	Watermans Observation Area
	NOR	Mullaloo Point to Yanchep Lagoon
	TRK	Yanchep Lagoon to Moore River
	SCR	Swan & Canning Rivers

LANCELIN	**Area Code**	**Description**
	LED	Moore River to Fence Reef
	LAN	Fence Reef to Wedge Island
	LAI	Lancelin Island Fish Habitat Protection Area

MANDURAH	**Area Code**	**Description**
	BOU	Cape Bouvard to Halls Head
	HAL	Halls Head to Becher Point
	PHE	Peel Harvey Estuary
	IND	Inland waters

MIDWEST REGION

ABROLHOS ISLANDS	Area Code	Description
	AIS	Abrolhos Islands (all)
	EST	Easter Group
	NIS	North Island
	SIS	Southern Group
	WAL	Wallabi Group

DONGARA	Area Code	Description
	FRW	Gum Tree Bay to White Point
	DON	White Point to Flat Rocks

GERALDTON	Area Code	Description
	GTN	Flat Rocks to Okabella Creek
	HOR	Olkabella Creek to White Cliffs
	PTG	White Cliffs to Shoal Pt
	KAL	Shoal Pt to Zypdorp Wreck
	OBW	Zypdorb wreck to outer Bay waters

JURIEN	Area Code	Description
	WED	Wedge Island to Kangaroo Pt
	CER	Kangaroo Pt to Hill River
	JUR	Hill River to Middle Head
	GHD	Middle Head to Dynamite Bay
	LEE	Dynamite Bay to Gum Tree Bay
Sanctuary Zones	WISZ	Wedge Island SZ
	TRSZ	Target Rock SZ
	GRSZ	Grey SZ
	CRSZ	Cavanagh Reef SZ
	NSZ	Nambung Bay SZ
	BRSZ	Booker Rocks SZ
	BISZ	Boullanger Island SZ
	PHSZ	Pumpkin Hollow SZ
	NHSZ	North Head SZ
	FISZ	Fisherman Island SZ

NORTHERN REGION

BROOME	Area Code	Description
	CBL	Cable Beach (NEEDS DESCRIPTION)
	BRM	Broome local (NEEDS DESCRIPTION)
	BVL	Cape Bossut to Gantheaume Point
	CWC	Gantheaume Point to Willey Creek
	WHC	Willey Creek to Hidden Creek
	HCL	Hidden Creek to Cape Leveque
	CKB	Cape Leveque to Kuri Bay

Sanctuary Zones	KBI	Kuri Bay to Bigge Island
	BCL	Bigge Island to Cape Londonderry
	LCD	Cape Londonderry to Cape Dermott
	CNT	Cape Dermott to NT border
	CAW	Cambridge Gulf – Wyndham
	DBY	Derby NEEDS DESCRIPTION
	FTZ	Fitzroy River
	KIS	King Sound
	ARG	Lake Argyle
	ORD	Ord River
	RBB	Roebuck Bay
	ROW	Rowley Shoals
	SBA	Scott, Browse & Ashmore Reefs
	ISZ	Imperieuse SZ
	CRSZ	Clerke Reef SZ

KARRATHA	**Area Code**	**Description**
	ONS	Ashburton River to & incl. Cane River (inc Onslow)
	FOR	Cane River to & incl. Fortescue River
	MTD	Fortescue to & incl. Maitland River
	DMP	Maitland River to & incl. Airport Creek
	KAR	Airport Creek to & incl. Dixon Island
	SAM	Dixon Island to & incl. Harding River
	ROB	Harding River to & incl. Turner River
	HED	Turner River to & incl. Tabba Tabba Creek
	DGY	Tabba Tabba Creek to Cape Keraudren
	SND	Cape Keraudren to Cape Bossut
	ARC	Dampier Archipelago
	DEP	Forestiere Islands incl. Depech & Westmore
	MNT	Montebello, Lowendal & Barrow Islands
	THV	Thevenard Islands
Sanctuary Zones	NMSZ	Northern Montebello's SZ
	SMSZ	Southern Montebello's SZ
	BISZ	Barrow Island SZ

SOUTHERN REGION

ALBANY	**Area Code**	**Description**
	SWH	Black Point to Broke Inlet
	BTW	Broke Inlet to Walpole
	RWW	Inland waters Windy Harbour to Walpole
	WTD	Walpole to Denmark
	RWD	Inland waters Walpole to Denmark
	DTA	Denmark to Albany
	ATR	Albany to Cape Riche
	RTF	Cape Riche to Fitzgerald River
	ALH	Albany Local Harbours

BUNBURY	**Area Code**	**Description**

	BYN	Cape Bouvard to Bunbury
	BYS	Bunbury to Capel River
	COL	Collie area incl. Collie River, Wellington & Harris dams
	DBK	Donnybrook, Balingup, Grimwade, Boyanup, Preston River, Glen Mervyn Dam, Boyup Brook, Bridgetown, Greenbushes
	HAR	Harvey area: Harvey River, Weir, Stirling & Logue Brook Dams

BUSSELTON	**Area Code**	**Description**
	GEO	Capel River to Cape Naturaliste
	HSW	HMAS Swan
	WCT	Cape Naturaliste to Cape Leeuwin (west coast)
	YRA	Yallingup Reef Area
	CBA	Cowaramup Bay
	SCT	Cape Leeuwin to Black Point (south coast)
	IRN	Inland Rivers North- Blackwood, Margaret, Capel, Vasse/Wonnerup, Carbunup and their tributaries
	IRS	Inland Rivers South- Warren, Shannon, Donnelly, Gardiner, Lake Jasper & waters around Manjimup, Pemberton, Northcliffe

ESPERANCE	**Area Code**	**Description**
	FTS	Fitzgerald River to Shoal Cape
	SID	Shoal Cape to Dempster Head
	DUD	Dempster Head to Duke of Orleans Bay
	DUI	Duke of Orleans to Israelite Bay
	ISA	Israelite Bay to SA Border
	ESP	Esperance

Appendix C – Pearl Area Codes

District (Zone)	Area Code	Area Description
Zone 1	EXP	Exmouth Gulf, Northwest Cape to and incl Entrance Pt Ashburton River
	OAF	Onslow, Ashburton River to and incl Fortesque River
	BLI	Barrow Island and Lowendal Island
	MBI	Monte Bello Islands
	FDI	Fortesque River to and incl Depuch Island
	DIB	Depuch Island to and incl Zone 2 Buffer Zone.
	ZN1	Zone 1 Other
Zone 2	EMB	Eighty Mile Beach
	CBG	Cape Bossut to and incl Gourdon Bay
	RBY	Roebuck Bay
	ZN2	Zone 2 Other
Zone 3	BGP	Gantheaume Point to and incl Cape Baskerville
	LPC	Cape Baskerville to and incl Lacepede Channel
	BBY	Beagle Bay
	PBP	Pender Bay to and incl One Arm point
	KSK	King Sound, One Arm Point to and incl Iron Island
	TDB	Talbot Bay, Iron Island to and incl Doubtful Bay
	ZN3	Zone 3 Other

District (Zone)	Area Code	Area Description
Zone 4	KBN	Kuri Bay, Doubtful Bay to and incl Port Nelson
	PNV	Port Nelson to and incl Cape Voltaire
	AGF	Admiralty Gulf, Cape Voltaire to and incl Cape Bouganville
	VSB	Vansittart Bay, Cape Voltaire to and incl Sir Grahamn Moore Island
	NBB	Napier Broome Bay, Sir Graham Moore Is to and incl Cape Talbot
	ZN4	Zone 4 Other
Other	CRN	Carnarvon
	DRW	Darwin
	BRO	Broome

Appendix D – Pearl Licensee Codes

Licensee Code	Pearling Company
AS	Australian Sea Pearls
AP	Arrow Pearls
BS	Blue Seas Pearls
BP	Broome Pearls
CH	Carnarvon Hatchery
CP	Clipper Pearls
CB	Cygnet Bay Pearls
CO	Cossack Pearls
DP	Dampier Pearls
DH	Darwin Hatchery
EX	Exmouth Pearls
HP	Hammaguchi Pearls
IN	Indian Ocean Pearls
MP	Maxima Pearling Company
MO	Morgan and Co
NW	North West Pearls
PH	Paspaley Broome Hatchery
PP	Paspaley Pearls Pty Ltd
PL	Pearls Pty Ltd
RB	Roebuck Pearls
SXP	Southern Cross Pearls