

Section 11

Conclusions and recommendations

11 Conclusions and recommendations

DCENR has conducted reviews of the hydrocarbon potential of the Atlantic Ireland Basins in 2005 (Slyne/Erris/Donegal Basins) and 2006 (Rockall and Porcupine Basins). The Porcupine Basin acreage has been included in a Frontier Exploration Licensing Round due to close for applications in December 2007 and this constitutes the Draft Plan.

The scenarios considered in the Draft Plan comprise the undertaking of 2D seismic data gathering in 2008 to 2010, 3D seismic data gathering in 2008 to 2013 followed by the drilling of up to 17 wells in the period 2008 to 2014. These activities will take place alongside existing exploration programmes planned as a result of previous licensing rounds up to 2014.

The conclusions from the assessment of the potential effects of implementing the draft plan are summarised below.

11.1 Conclusions

11.1.1 Noise generation

Seismic

Modelling indicates that baleen whales and fish may show some form of avoidance reaction up to approximately 20 and 11.5 km respectively from a seismic sound source of 248 dB (re 1 μ Pa). However, field research has indicated that these zones of avoidance behaviour may be reduced or extended under certain conditions. Individual animals might leave or avoid this area, but may be expected to return soon after operations have ceased. There is very little information on the effects of seismic noise on seals but, on a conservative estimation, the avoidance behaviour might be considered similar to that of baleen whales. Of the odontocetes, it appears that the smaller species in particular, ie the dolphins and porpoises, show a degree of avoidance behaviour up to a distance of some 5 to 6 km from the sound sources (Stone, 2003). The degree in avoidance behaviour of the larger odontocetes species that might be present in the IOSEA2 area (such as killer, pilot and sperm whales) varies considerably among a number of observational studies from around the world, and therefore should be considered to be inconclusive at this stage.

In order to minimise any possible impacts on marine mammals, the use of the revised NPWS guidelines (NPWS, 2007), should be mandatory, including the use of risk assessment in survey planning and the employment of MMOs to undertake visual monitoring during the survey and ensure that the survey is conducted in line with the NPWS guidelines. The use of slow, soft starts of the air guns would also alert marine mammals to the impending full seismic activity and give them time to vacate the immediate area. Pending review of PAM best practice (eg its use at night or in poor sea conditions), PAM devices could be used to monitor the area for vocalising cetaceans during the survey, particularly in areas or times of peak sensitivity, and seismic operations delayed if marine mammals are detected.

The behavioural response shown by fish is to move away from the seismic survey sound sources temporarily. Research indicates that such movements are short lived and that the fish stocks will most likely return to the area after completion of the survey. Surveys should be planned to avoid known fish spawning areas and spawning times.

In conclusion, if the mitigation measures proposed here are adopted, the direct, short-term environmental impact of noise, from individual seismic surveys within the IOSEA2 area, will be minimal. It should be noted however that the effects of multiple surveys taking place at the same time are not well understood and, where possible, the timing of each survey should be considered carefully in order to avoid surveys taking place simultaneously. For this reason it is recommended that simultaneous surveys should be separated by a distance of at least 100 km, so that marine mammals and fish have the chance to avoid these areas and migration routes are not impeded.

The long term, synergistic and cumulative impacts of sound sources in water are poorly understood. As a result, the introduction of additional low frequency noise into the marine environment from seismic surveys in the IOSEA2 area should be considered to have the potential to create a cumulative effect. However, the relatively short duration of the activities and relatively small radius of predicted



effect suggests that seismic surveys and drilling operations are expected to have a limited temporal and spatial impact on the marine mammal and fish populations when appropriate mitigation measures are in place.

Drilling

Low frequency noises from drilling wells, and all associated vessels, will add to the ambient noise in IOSEA2 area of the Porcupine Basin. As toothed whales have hearing ranges at medium to high frequencies, they are considered to be relatively unharmed by industrial noise. Baleen whales are considered to be most at risk, since the frequencies used in their communication noises and assumed levels of hearing overlap with the sound spectra of industrial noises. Several large baleen whale species have been recorded in low numbers in the IOSEA2 area, including minke, sei, fin, humpback and blue whales. Almost no distributional data currently exist for seals in the offshore areas west of Ireland.

The impact of the noise generated is difficult to assess due to uncertainties in how noise affects specific marine mammals, and how far the noise will transmit in the sea. However, it is estimated that the underwater noise produced could elicit response from marine mammals if they pass within 1 km of a drilling rig carrying out drilling operations. It is not believed likely that such effects would have any significant impacts at the population level. Auditory damage could only occur within a much smaller zone, and the whales would probably not remain close to such a noise source for any length of time.

The assessment of available information taking into account the number of wells forecast to be drilled in the IOSEA2 area (a maximum of 43 wells), together with the short duration of each drilling scenario (50 days), does not indicate any significant impacts from underwater noise generated during drilling operations. However it is felt that the effect of noise on marine animals is still poorly understood and warrants further investigation in the context of this and other noise-producing exploratory activities.

It is unlikely that there will be any significant consequences of these two sound sources (seismic survey and drilling activity) interacting. Both activities are temporary and of short duration. In addition, the low level (and density) of oil and gas-related seismic and drilling activity identified in the draft plan, combined with the current low level of other activities such as oil and gas and shipping, should not lead to the creation of large exclusion areas.

11.1.2 Discharge of cuttings and disturbance to sea bed

Using the significance criteria defined in Section 6, the discharges of cuttings and muds near the sea surface are expected to have a minor impact on both the water column and the sea bed. The substantial water depths (>50 m) and the oceanographic conditions in the area enable good dispersion and dilution.

The discharges of drill cuttings, muds and cement from the top sections of the wells, which are deposited close to the sea bed at the wellheads, are expected to have a moderate impact at each well site. However, the area affected will be very small, and any adverse effects on the benthic communities are expected to be limited to the immediate vicinity of the wellheads (generally within 50 m). The cuttings piles are expected to be dispersed completely over a time scale of 1 to 10 years, and the overall impact is not likely to be significant.

The greatest potential for significant impact at the sea bed arises from direct damage by placement and scouring of anchors and chains. If wells and anchors are well sited using adequate site-specific data on megafaunal communities, these impacts can be minimised.

The potential impacts arising from drilling discharges and disturbance to the seabed from anchoring, whilst generally minor or moderate, assume a higher significance in the context of the offshore cSACs within the IOSEA2 area. The risks of adversely affecting the integrity of the benthic ecological features for which these two cSACs have been proposed remain potentially significant regardless of mitigation.

It is prohibited to discharge to sea cuttings contaminated with OBM or SBM. Cuttings shipped to shore for treatment and disposal will be dealt with under the local authority waste management plan.

11.1.3 Atmospheric emissions

Atmospheric emissions will arise from both seismic survey vessels and drilling activity following the current licensing round. Seismic vessel activity in the Porcupine Basin area may be up to five times that seen on average since the mid 1960's for the whole of offshore Ireland, whilst drilling activity may

be similar to that seen on average since the 1970's. The resultant emissions will not have any significant localised impacts due to the dispersive nature of the offshore environment. They will contribute regionally and globally to issues such as global warming, acidification and air pollution but, given their relative scale compared to existing emissions nationally and at a European level, these contributions are considered to be insignificant.

The combination of atmospheric emissions from seismic survey vessel operations and drilling activity will not substantially augment emissions generated from Irish activities as a whole, and any resultant impacts can be viewed as being insignificant.

11.1.4 Physical presence

Any effects to fisheries from seismic survey or drilling are likely to be minor. The seismic survey and drilling activity that may be undertaken as a result of this Frontier Exploration Licensing Round is modest, the duration of the surveys and drilling is short, and much of the IOSEA2 area is not subject to high levels of fishing and vessel activity. Therefore the impact of the physical presence of seismic surveys and drilling rigs on fishing activity and the passage of other shipping is not considered to be significant.

As stated above fishing vessel sighting data suggest that, apart from shallower areas over the shelf edge, fishing effort is relatively low. Interactions between physical presence and fishing/shipping will not increase significantly from present levels.

11.1.5 Accidental events

The risk of a major crude oil spill or gas blowout during exploration, appraisal and development drilling is considered to be very low. Historical data suggest that small diesel spills of less than one tonne represent the most likely accidental hydrocarbon release scenario. Impacts from diesel spills of this magnitude and frequency (one spill in every 4,404.8 MODU days) would be negligible. In coastal areas, ecological sensitivities are generally high throughout the year. In offshore waters, the likelihood is that seabirds will be present that may be vulnerable to accidental hydrocarbon spills but there are insufficient data to confirm this assessment or to judge on any seasonal variation in this sensitivity.

11.1.6 Cumulative impacts

The exploratory oil and gas activity proposed in the Draft Plan for the IOSEA2 area is modest in scale, but represents a potentially large increase in activity compared to previous levels since the 1970s. None of the activities assessed has any real potential to add to, augment or overlap with impacts that may have occurred in the Porcupine Basin, or with those from other activities past or planned. Uncertainties exist in the assessment of seismic noise impacts on marine mammals, due both to a lack of data on the occurrence of various species using the IOSEA2 area and to a lack of understanding as to the impacts (and cumulative impacts through increased activity or prolonged activity over time) of underwater noise on these animals. Nevertheless, information currently available from other parts of the world suggest that marine mammal populations have so far not been noticeably affected by oil and gas operations.

11.1.7 Transboundary impacts

The nearest transboundary line (with the UK) lies more than 160 km to the west of the IOSEA2 area. No significant potential exists for transboundary impacts from the Draft Plan.

11.2 Data gaps

Owing to the nature of the offshore marine environment and the complexity and scale of the tasks involved in offshore marine data collection, it is recognised our overall knowledge is either poor or lacking in many important respects. Thus it is a consistent feature of marine environmental assessments, and particularly offshore assessments that they are as likely to highlight information gaps as to fill them. This situation is common to most other areas of marine oil and gas exploration and, in this aspect, the current SEA process faces the same challenges as similar undertakings elsewhere.



Through a comprehensive review process, this IOSEA has highlighted and documented the now considerable body of data and information that has been generated from survey work carried out in the offshore regions west of Ireland within and around the IOSEA2 area. The quality, consistency and coherence of survey coverage has increased dramatically over time, and this trend is particularly noticeable in the last six years. Many of these surveys have been conducted under the auspices of PIP, and latterly the INSS being co-ordinated by GSI and the Marine Institute and various other programmes such as the European-funded MESH project to map seabed habitats and previous projects like GEOMOUND, ECOMOUND and ACES mapping deepwater coral communities (EU Fifth Framework Programme). At present, interpretation of the data gathered and publication of findings is incomplete and ongoing at the GSI, the Marine Institute, universities and other institutions in both Ireland and abroad.

As outputs become available from this work, they will be of use in informing project-specific environmental assessments for some proposed exploration activities. However, the DCENR recognises that the work is not exhaustive, nor has it produced coherent coverage of sufficient resolution to allow detailed concrete statements to be generated regarding environmental features. While the IOSEA2 has recognised the existence of significant data gaps (see details below), the approach of the regulatory authorities, consistent with the precautionary approach, is that all reasonable steps be taken both at national level and at site specific level to acquire the additional knowledge necessary to inform how offshore operations can best proceed in a sustainable manner. Regulatory processes should be sufficiently flexible to allow the review of operational practices by industry and regulators on a regular basis, eg to facilitate the integration into decision-making of new scientific findings as they come on stream.

There is a number of specific scientific themes for which data coverage is currently either sparse or non-existent in both spatial and temporal domains as outlined below.

11.2.1 Specific data gaps

Mapping of the sea bed in terms of habitat and community types has been initiated in nearshore sublittoral areas, but no wide-area maps are yet available for regions further offshore. This shortfall will be addressed in part by the PIP, INSS and MESH programmes already underway. Until more is known of these aspects of the marine environment on a regional or national scale, and until the scarcity or otherwise of certain habitats and species is better understood, meaningful environmental assessments on the basis of current knowledge will be difficult and priorities on management or protection measures difficult to apply. The dangers of extrapolation between one location and another in the IOSEA2 area are evident, and a precautionary approach needs to be considered in the meantime. The following is a summary of the data gaps identified throughout this report.

- In the context of oil and gas related exploration activity, environmental data (physical, chemical and biological) collected as part of the impact assessment process for oil and gas industry activities, could be collated in a readily accessible database and reviewed at suitable intervals.
- Irish waters support a diverse fish and shellfish fauna, including many commercially important species, but relatively little synthesised information on the species present and their distribution has been made available. This applies in particular to deep water fish species for which the available information is dated and limited. With the further development of deep water fishing, and increasing numbers of deep water surveys, knowledge of the fish and shellfish species is starting to grow.
- Reliable overviews of commercial fish distributions and the fisheries that exploit them were not available to this SEA process. Though a number of surveys have been carried out, including acoustic and groundfish surveys, there is currently insufficient coverage, or correlation between annual results to build up regional and temporal overviews of the area.
- In the context of climate change and with changes in sea temperature, the fish spawning and nursery ground information in Coull *et al* (1998) is becoming dated. Fish larval surveys are taking place in Irish waters (Dransfeld *et al*, 2004) and the findings of these have been used to update the location of fish spawning and nursery grounds.
- Comparatively little is known about the numbers and distribution of marine mammals in the offshore environment, their use of the area and its resources, and their vulnerability to anthropogenic impacts of various types at different times of the year. Visual survey effort is currently limited offshore of the continental shelf break in autumn and winter due to poor weather conditions and reduced daylight hours. There is therefore a need for a strategic co-

ordinated survey and monitoring programme based on good science. Irish scientists recently carried out a programme of acoustic monitoring to complement their broadscale visual surveys. It is recommended that such acoustic work be continued over a wider area and throughout the year.

- Existing MMO reports from seismic surveys have not been collated into the main body of knowledge on cetaceans. With suitable co-ordination and methods development, existing cetacean data gathering could be augmented by the MMO reports from seismic surveys. Approaches to acoustic disturbance mitigation measures in general (such as the benefits or otherwise of 'soft starts' and the utility of passive acoustic monitoring or PAM) will benefit from ongoing research to evaluate the effectiveness of these measures.
- Very little is known about the existing levels of anthropogenic noise in the IOSEA2 area, and the significance of additional anthropogenic sound inputs on either fish or marine mammals.
- Further information on the timing and location of cetacean calving and migrations is needed. At present, SOSUS data have indicated the possibility of a winter migration to the south along the Rockall Basin (outside and to the northwest of the IOSEA2 area) for humpback whales in late winter or early spring (Charif & Clark, 2000), although there is no indication yet of any returning northward migration, and animals of the same species also appear to be present in the offshore area throughout the year. In addition, further information is needed on the possible location, prevalence and timing of beaked whale feeding grounds in deep-water canyon systems within the IOSEA2 area.
- Few data currently exist to identify foraging areas for seal species along the Irish Shelf, including the IOSEA2 area. The first attempts to determine the offshore distribution of both common and grey seals in Irish waters, using tagging and satellite telemetry methods, began last year. A nationwide survey to assess the abundance and distribution of grey seals around Ireland's coasts was carried out by NPW and CMRC.
- Whilst much general information about the sea bed and benthos (including depth, topography and sea bed type) in the IOSEA2 area has been gathered in recent years, much analysis is still underway and is currently unavailable for environmental assessment.
- Comparatively little is known about the numbers and seasonal distribution of seabirds in the offshore environment, and their vulnerability to surface pollution at different times of the year. During the autumn and winter months, visual survey effort is limited to the continental shelf, but rarely extends into the deeper parts of the IOSEA2 area, due to poor weather conditions and reduced daylight hours.
- Block-specific data indicating seabird vulnerability to surface pollution is only currently available from JNCC Seabirds At Sea Team surveys from the 1990s, which only partially cover Irish waters. It is recommended more recent CMRC seabird surveys, looking at the offshore area west of Ireland, should be used to update this information.

11.3 Overall recommendations

Based on the environmental baseline description given in Section 5 and the Annex to this report, and on the impact assessments in Sections 7, 8 and 9, the following recommendations are made with respect to SEA process itself and how it was conducted, the licensing and regulation system for exploration and appraisal, and for mitigating the impacts of the proposed Draft Plan.

11.3.1 Data gaps and data management

As for the IOSEA1 of 2006, a number of key thematic, temporal and spatial data gaps have been identified in this report. These may be considered at the strategic or site-specific level. In situations where an absence of data may materially affect the capacity to knowledgeably mitigate the potential impacts of exploration activities, the precautionary approach based on current best practice has been recommended without exception.

- 1) **Regulatory processes should allow the review of operational practices by industry and regulators on a regular basis as appropriate, to facilitate the integration into decision-making of new scientific findings as they come on stream.**



- 2) **The monitoring programmes resulting from implementation of this licensing programme should be designed to generate datasets that can support both strategic and site-specific approaches to environmental assessment.**
- 3) **National marine monitoring and data gathering initiatives should be integrated and harmonised across and between the various state agencies, academic institutions and commercial operators.**
- 4) **Environmental data (physical, chemical, biological and relating to other sea users) collected through IOSEA2, should be collated and held in a co-ordinated and readily accessible database at an identified location (possibly within the DCENR or MI) for use in future IOSEAs and other oil and gas-related environmental assessments.**

11.3.2 Licensing and regulation

The Rules and Procedures Manual (DCMNR/PAD, 2007a) require that an environmental area assessment (EAA) is completed and submitted with any application for a drilling permit.

- 5) **The EAA and its surveys should be consistent with the OSPAR guideline 2004-11 for monitoring the impact of offshore oil and gas activities, and should be used to advise the decision making process.**
- 6) **Site-specific surveys as part of EAA should be carried out in advance of drilling in accordance with the OSPAR guidance. These should describe the existing physical, chemical and biological conditions and where necessary archaeology. The EAA should also describe the likely impacts on pelagic organisms and specific natural resources.**
- 7) **The application and EAA should be assessed by the appropriate statutory bodies prior to issue of the drilling permit.**
- 8) **A framework for consultation regarding proposed activities and developments with the relevant statutory bodies needs to be developed. For example, guidelines for site survey procedures should be developed with the appropriate statutory authorities to ensure that damage does not occur to sensitive heritage features.**
- 9) **The Minister should, in certain circumstances, consider requesting the submission of a more detailed assessment up to and including an EIS. Criteria which might indicate or support this greater level of assessment could include:**
 - **distance from offshore European sites, coastline and international boundaries;**
 - **proximity to vulnerable concentrations of marine mammals or seabirds;**
 - **the presence of spawning, nursery and fishing grounds for commercially valuable fish and shellfish species (particularly herring, sandeel and Dublin Bay prawn for example);**
 - **proximity to features of ecological interest identified within Annexes to the Habitats Directive and OSPAR;**
 - **where proposed operations may significantly interfere with other sea users.**
- 10) **The communication and enforcement measures for exclusion zones around the sea bed infrastructure of the oil and gas industry (such as suspended wells and sub-sea field developments) should be reviewed and strengthened. The aim here is to improve mapping, information exchange, integration with fisheries monitoring procedures and interfaces with other marine users such as the Irish Naval Service and marine research establishments.**
- 11) **The existing regulatory framework and decision making process, as outlined in the Rules and Procedures documents of the DCENR should be updated with a view to greater clarity and transparency for the benefit of all stakeholders.**

11.3.3 Seismic survey

Under Section 2.1 of the Rules and Procedures (DCMNR/PAD, 2007a) applicants are required to submit an Application for Approval to DCENR to conduct any geophysical or other exploration survey, site survey or route survey prior to the planned commencement of the survey. The rules and procedures

oblige operators to have due regard to the NPWS guidelines on minimising acoustic disturbance to marine mammals, and that consultation takes place with appropriate bodies including the DCENR and DoEHLG.

- 12) **The Steering Group recommends that seismic survey activities should not be permitted within the Belgica Mound Province cSAC and the Hovland Mound Province cSAC. This is on the grounds that it cannot be precluded, on the basis of currently available scientific information, that such activities will not impinge on the integrity of these two sites.**
- 13) **The application for approval to conduct seismic survey should include an assessment of the information available at the time on the marine environment (specifically including the location and timing of marine use of the area and fish spawning/timing in the proposed survey area) together with any specific mitigation measures proposed.**
- 14) **The application for seismic survey should be sent to appropriate statutory bodies for environmental and heritage consideration within an agreed timeframe. These bodies should consult with other expert organisations or individuals as appropriate and may recommend changes to the timing or other aspects of mitigation.**
- 15) **The NPWS (2007) guidelines should be made a requirement for all seismic surveys and incorporated into the DCENR Rules and Procedures Manual (DCMNR/PAD, 2007a). Supplementary to the NPWS Guidelines, sufficient MMO personnel should be available to cover shift working if appropriate.**
- 16) **Multiple surveys in the same area and at the same time should be combined into consecutive surveys through appropriate planning and cooperation. The DCENR should work with operators to ensure that surveys are co-ordinated in this respect according to currently available best practice guidance from appropriate specialists.**
- 17) **If surveys must be carried out simultaneously, a separation distance of 100 km should be observed between survey vessels, so that marine mammals and fish have the chance to avoid these areas and migration routes are not impeded. This should be incorporated into the DCENR Rules and Procedures Manual (DCMNR/PAD, 2007a).**
- 18) **Notification of seismic survey activity planned within 100 km of each other or within 100 km of the Ireland/UK boundary should be exchanged between the appropriate licensing authorities. Central co-ordination of seismic survey activity should also take account of similar activities being undertaken by the marine scientific research community.**
- 19) **Comparatively little is known about the numbers and distribution of marine mammals in the offshore environment, their use of the area and its resources, and their vulnerability to anthropogenic impacts of various types at different times of the year. Visual survey effort is currently limited offshore of the continental shelf break in autumn and winter due to poor weather conditions and reduced daylight hours. There is therefore a need for a strategic co-ordinated survey and monitoring programme based on good science. Irish scientists recently carried out a programme of acoustic monitoring to complement their broadscale visual surveys. It is recommended that such acoustic work be continued over a wider area and throughout the year.**

11.3.4 Exploration drilling

Certain sea bed features occurring in the Porcupine Basin area, mainly carbonate mounds of the Hovland, Magellan and Belgica Mound Provinces, qualify as Annex 1 habitat features under the Habitats Directive (Figure 5.4 and Section 5.1.2). Two areas of seabed within these Mound Provinces have been designated as offshore SACs on the basis of their seabed features and associated coral reef communities (Figure 5.14).

- 20) **The Steering Group recommends that drilling activities should not be permitted within the Belgica Mound Province cSAC and the Hovland Mound Province cSAC. This is on the grounds that it cannot be precluded, on the basis of currently available scientific information, that such activities will not impinge on the integrity of these two sites.**



- 21) **Other carbonate mounds and habitats or species listed in Habitats Directive Annex I, II and IV and OSPAR Annex V in the Porcupine Basin should be included for licensing but treated as sensitive areas. Subject to the recommendation made above in Section 11.3.3 being put into effect, exploration drilling should be subject to EIS and regulated to avoid direct damage to such features and their biological communities. This will require appropriate site-specific survey. As the results of current survey work become available, and particularly as the seabed classification for the area is refined, the number of sensitive sites or areas may increase.**
- 22) **In the event of a well being suspended, over-trawlable protection should be put in place in areas most used for demersal fishing activities.**
- 23) **With regard to well testing, methods avoiding the need for flaring, such as closed chamber well testing systems, should be considered where possible.**

11.3.5 Monitoring and reporting

- 24) **A 6-monthly report is prepared by the DCENR for the government, in line with other sectors, that summarises the activities of the oil and gas industry in Ireland, including a list of current licenses, consents issued, wells drilled and surveys undertaken. This should be developed as the basis for the required monitoring of activity levels, and to confirm activity levels are in line with those predicted.**
- 25) **The licensing authority should ensure that an appropriate monitoring programme be devised for evaluating the environmental impacts and efficacy of mitigation measures relating to the key potential environmental issues that were identified as significant in Section 6, Table 6.4 of this report. This should be carried out in consultation with appropriate statutory bodies and specialists.**
- 26) **The DCENR should consult with relevant bodies including the Marine Institute in order to review the environmental monitoring framework and any gaps therein in light of the IOSEA2 assessment.**

11.3.6 Future oil and gas activity in the IOSEA2 area

It was proposed in Section 1.4 that subsequent phases of the current licensing round be the subject of further SEA at a future date.

- 27) **In the event of Phases 1 and 2 of the current round being successful (ie that commercially viable hydrocarbon reserves are located) or by 2014, the competent authority should decide on the arrangements for follow-up SEA in the IOSEA2 area. This decision should be informed by up-to-date information (eg the DCENR activity level reports) and should also consider the full life-cycle of development from exploration to decommissioning, with the aim of providing an integrated SEA framework for the individual EIAs that will be taking place.**
- 28) **The licensing authority (DCENR) will ensure that appropriate best practice guidelines are developed where required, implemented in consultation with other statutory authorities and relevant specialists, and kept updated in line with scientific knowledge and to lead the way for industry best practice. Developments in best practice will be applied to existing as well as to new licenses.**
- 29) **Environmental awareness training should be carried out at all levels to promote best practice within industry operations.**
- 30) **Fuel efficiency should be maximised in the selection process for survey vessels, and the use of low sulphur fuel is recommended. Selection of a contractor with demonstrable planned preventative maintenance procedures will lead to fewer emissions and equipment failures.**

11.4 Overall conclusions

The Draft Plan is to offer offshore blocks for hydrocarbon exploration in the current Frontier Exploration Licensing Round in the Porcupine Basin. A strategic assessment has been carried out on the potential for environmental impacts, based on scenarios for the likely scale of activity, a literature search, a data gathering exercise, and inputs from public consultation feedback combined with the expert judgement of the Steering Group, ERT and Aqua-Fact consultants and the Environmental Authorities. On the basis of the assessment conducted, certain constraints have been proposed (see Section 11.3). If these constraints, together with the mitigation, monitoring measures and recommendations are put into place (see Sections 10 and 11), the Steering Group is of the opinion that the Draft Plan can be adopted and implemented without causing significant environmental impacts.