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MEMORANDUM

Data : 15 novembre 2014

Oggetto : Schlumberger Italiana S.p.A. ("Schlumberger"). Istanza di "permesso di prospezione" in mare "d 1 E.P-.SC". Memoria di replica alle "osservazioni" di cui all'art. 24, comma 4, del Decreto legislativo del 3 aprile 2006, n. 152 recante "Norme in materia ambientale" ("D.Lgs. 152/2006").

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Le 377 "osservazioni" formulate in relazione alla procedura di valutazione di impatto ambientale ("VIA"), relativa all'istanza di "permesso di prospezione" in mare "d 1 E.P-.SC", presentata dalla Schlumberger, sollevano sostanzialmente le seguenti quattro tematiche che impongono una replica: I) la pretesa compressione delle attività consentite dal "permesso di prospezione" richiesto dalla Schlumberger; II) la pretesa coincidenza dell'area dell'istanza della Schlumberger con il "Santuario per i mammiferi marini"; III) la pretesa mancata protezione dei cetacei da parte della Schlumberger; IV) la pretesa violazione della "Convenzione europea sul paesaggio".

I) LA PRETESA COMPRESIONE DELLE ATTIVITÀ CONSENTITE DAL "PERMESSO DI PROSPEZIONE" RICHIESTO DALLA SCHLUMBERGER.

La pretesa compressione delle attività consentite dal "permesso di prospezione" richiesto dalla Schlumberger è evidenziata principalmente da una tesi sostenuta da alcuni autori di "osservazioni", secondo cui:

Le attività di ricerca di idrocarburi prevedono diverse fasi ognuna delle quali ad un particolare e rilevante impatto ambientale. Nella prima fase viene eseguito uno studio geologico regionale con la rielaborazione e l'interpretazione dei dati sismici, in alcuni casi già esistenti e successiva acquisizione di nuovi dati sismici (Osservazioni 7 ed 8).

Una volta completata la prima fase, nel caso si evidenzi un'area di interesse minerario, sarà eseguito in seconda fase un pozzo esplorativo a profondità di diverse migliaia di metri, nel malaugurato caso si decidesse di proseguire l'attività estrattiva, in ultima fase verrà costruita una piattaforma permanente di estrazione che implicherà attività di stoccaggio e trasporto di idrocarburi con strutture a terra e ulteriore traffico navale annessi (Osservazione 13).

Inoltre, altri autori di "osservazioni" ritengono che l'attività proposta dalla Schlumberger si sostanzia in un "programma di ricerca" (Osservazione 4), in un "progetto di ricerca di idrocarburi" (Osservazioni 19 e 23), o di "ricerche petrolifere" (Osservazione 20).

La legge sulla prospezione, ricerca e coltivazione degli idrocarburi e la regolamentazione amministrativa di attuazione prevedono tre titoli minerari: "permesso di prospezione", "permesso di ricerca" e "concessione di coltivazione".

Il primo comma dell'articolo 2, del Decreto del Direttore Generale per le Risorse Minerarie ed Energetiche del Ministero dello Sviluppo Economico del 22 marzo 2011, recante "Procedure operative di attuazione del decreto ministeriale 4 marzo 2011 e modalità di svolgimento delle attività di prospezione, ricerca e coltivazione di idrocarburi liquidi e gassosi e dei relativi controlli ..." ("Decreto 22/03/2011"), contiene le "Definizioni" e delle "attività" consentite dai tre titoli minerari:

- h) "permesso di prospezione": titolo non esclusivo che consente le attività di prospezione ...
- i) "permesso di ricerca": titolo esclusivo che consente le attività di ricerca ...
- j) "concessione di coltivazione": titolo esclusivo che consente le attività di sviluppo e coltivazione di un giacimento di idrocarburi liquidi e gassosi e le attività di ricerca previste nel programma lavori ...
- k) "attività di prospezione": attività consistente in rilievi geografici, geologici, geochimici e geofisici eseguiti con qualunque metodo e mezzo, escluse le perforazioni dei pozzi esplorativi di ogni specie, intese ad accertare la natura del sottosuolo e del sottofondo marino;
- l) "attività di ricerca": insieme delle operazioni volte all'accertamento dell'esistenza di idrocarburi liquidi e gassosi, comprendenti le attività di indagine geologiche, geochimiche e geofisiche, eseguite con qualunque metodo e mezzo, nonché l'attività di perforazione ...
- m) "attività di coltivazione": insieme delle operazioni necessarie per la produzione di idrocarburi liquidi e gassosi;

Va precisato che il "permesso di prospezione" è "accordato per la durata di un anno" (Art. 10 della Legge 613/1967), mentre la durata del "permesso di ricerca" è di sei anni ed "il titolare ha diritto a due successive proroghe di tre anni ciascuna, se ha adempiuto agli obblighi derivanti dal permesso stesso" (Art. 6 della Legge 9/1991). "La durata della concessione di coltivazione è di trenta anni" (Art. 29, primo comma della Legge 613/1967).

La Schlumberger ha richiesto all'autorità competente un "permesso di prospezione" che consente le sole "attività di prospezione" e che esclude le "attività di ricerca", previste dal "permesso di ricerca" e le "attività di coltivazione", previste dalla "concessione di coltivazione", come definite dal succitato primo comma dell'art. 2 del Decreto 22/03/2011.

Pertanto, ai sensi di legge e contrariamente a quanto affermato da alcuni autori delle "osservazioni", l'"attività" proposta dalla Schlumberger non si sostanzia né in un "programma di ricerca", né in un "progetto di ricerca di idrocarburi" e non è finalizzato a "ricerche petrolifere".

II) LA PRETESA COINCIDENZA DELL'AREA DELL'ISTANZA DELLA SCHLUMBERGER CON IL "SANTUARIO PER I MAMMIFERI MARINI".

1) Sostiene un autore (Osservazione 15) che:

L'area prescelta risulta essere coincidente di fatto con il Santuario per i mammiferi marini Pelagos, nato da un accordo internazionale tra Italia, Francia e principato di Monaco siglato a Roma nel 1999.

L'atto internazionale in questione è lo "Accordo relativo alla creazione nel Mediterraneo di un santuario per i mammiferi marini", fatto a Roma il 25 novembre 1999 e reso esecutivo con Legge 11 ottobre 2001, n. 391 ed entrato in vigore il 21 febbraio 2002.

Si allega copia della mappa geografica con "aggiornamento al 4 settembre 2014", pubblicata sul sito web del Ministero dell'ambiente e della tutela del territorio e del mare, avente ad oggetto: "Santuario per i mammiferi marini nel Mediterraneo. Comuni rivieraschi della parte italiana ricadenti nell'area" (All. 1).

Si allega anche copia della mappa geografica relativa alla "Istanza di permesso di prospezione d 1 E.P_.SC" della Schlumberger, pubblicata nel "BUIG – Bollettino ufficiale degli idrocarburi e delle georisorse – Anno LVIII N. 2 – 28 Febbraio 2014" (All. 2).

Le due mappe geografiche allegate, dimostrano l'infondatezza della tesi sostenuta da un autore di "osservazioni", secondo cui "l'area prescelta" dalla Schlumberger "risulta essere coincidente di fatto con il Santuario per i mammiferi marini Pelagos".

III) LA PRETESA MANCATA PROTEZIONE DEI CETACEI DA PARTE DELLA SCHLUMBERGER

Attestano vari autori di "osservazioni" che:

Le aree oggetto delle istanze di ricerca di idrocarburi sono zone di importanza strategica per la complessa e straordinaria vita dei cetacei ... (osservazione 14)

(Si dovrebbe) negare ... il parere positivo alla valutazione ambientale, proprio per la consistente presenza e attività di cetacei nell'area sottoposta al progetto di ricerca di idrocarburi. (Osservazione 19).

Per l'acquisizione geofisica nell'area dell'istanza di permesso di prospezione è previsto l'utilizzo della tecnologia Air-gun, tipicamente utilizzata per i rilievi sismici marini (Osservazione 5).

1) La tesi, secondo cui dovrebbe negarsi "il parere positivo" alla VIA "per la consistente presenza ed attività di cetacei" nella zona di mare oggetto del richiesto "permesso di prospezione", è smentita dal precedente punto II in cui si è dimostrata la non coincidenza dell'area in questione con il santuario per i mammiferi marini tutelato da norme internazionali.

2) Ma anche l'altra tesi, secondo cui dovrebbe negarsi "il parere positivo" alla VIA in quanto "è previsto l'utilizzo della tecnologia air-gun", non trova fondamento nella regolamentazione di attuazione dell'"Accordo sulla conservazione dei cetacei del Mar Nero, del Mediterraneo e dell'area atlantica contigua", fatto a Monaco il 24

novembre 1996 e reso esecutivo con Legge 10 febbraio 2005, n. 27 ed entrato in vigore il 1 settembre 2005 ("Accordo ACCOBAMS").

Nella premessa dell'Accordo ACCOBAMS viene attestato:

... che i cetacei sono parte integrante dell'ecosistema marino che deve essere preservato a vantaggio delle generazioni presenti e future e che la loro conservazione è una preoccupazione comune; (va riconosciuta) l'importanza di integrare le azioni di conservazione per i cetacei con le attività relative allo sviluppo socioeconomico delle Parti interessate a detto Accordo, ivi comprese attività marittime come la pesca e la libera circolazione delle navi secondo il diritto internazionale.

L'art. VII dell'Accordo ACCOBAMS prevede l'istituzione di "un Comitato scientifico composto da esperti qualificati nella scienza della conservazione dei cetacei".

Inoltre, nel "Piano di conservazione" allegato all'Accordo ACCOBAMS si prevede (art. 1, c)

... che siano effettuati studi d'impatto destinati a servire da base all'autorizzazione ... di attività suscettibili di pregiudicare i cetacei o i loro habitat nella zona dell'Accordo, ivi compresa la pesca, la **prospezione** e la gestione off-shore, gli sport nautici, il turismo e l'osservazione dei cetacei ...

Dando attuazione a quanto previsto nel "Piano di conservazione", il Comitato scientifico, istituito dall'Accordo ACCOBAMS, ha elaborato le "Guidelines to address the impact of anthropogenic noise on cetaceans in the ACCOBAMS area" (: Linee guida per contrastare l'impatto del rumore antropogenico sui cetacei nell'area (dell'Accordo) ACCOBAMS), annesso alla "Resolution 4.17" (: Deliberazione 4.17) e qui allegate in copia ("Linee Guida") (**All. 3**).

Si attesta nella premessa alle Linee Guida che (punti 1 e 2) (tradotto dall'inglese):

Il rapporto del Comitato Scientifico sull'impatto del rumore antropogenico sui cetacei dell'area (dell'Accordo) ACCOBAMS e le linee guida ... (devono essere) pubblicizzate tra le Parti (Stati) e gli operatori di fonti di rumore (ad esempio l'industria delle indagini sismiche ...

Un capitolo a parte del documento è dedicato alle "Guidelines for seismic surveys and airgun uses" (: Linee guida per indagini sismiche e gli usi della pistola ad aria compressa).

Le "Linee guida per indagini sismiche e gli usi dell'airgun", elaborate dal Comitato scientifico istituito nell'ambito dell'Accordo ACCOBAMS dimostrano che detto metodo d'indagine di prospezione sismica è approvato e regolamentato a livello internazionale e recepito nel nostro ordinamento.

Nella conduzione delle attività consentite dal richiesto "permesso di prospezione", la Schlumberger si atterrà alle Linee Guida elaborate dal Comitato scientifico istituito nell'ambito dell'Accordo ACCOBAMS.

IV) LA PRETESA VIOLAZIONE DELLA "CONVENZIONE EUROPEA SUL PAESAGGIO".

Secondo un autore (osservazione 2), l'istanza di "permesso di prospezione" presentata dalla Schlumberger violerebbe la "Convenzione europea sul paesaggio", fatta a Firenze il 20 ottobre 2000 e resa esecutiva con Legge 9 gennaio 2006 n. 14 ed entrata in vigore sul piano internazionale il 1 settembre 2006 ("Convenzione sul paesaggio").

Sempre secondo detto autore di "osservazioni", la Convenzione sul paesaggio è stata "recepita nel 2006 dallo Stato italiano e fatta propria" dagli artt. 131 e 132 del Decreto Legislativo 22 gennaio 2004, n. 42 recante "Codice dei beni culturali e del paesaggio ...".

Argomenta anche detto autore che la Convenzione sul paesaggio si applicherebbe all'area oggetto del richiesto "permesso di prospezione", in quanto situata in "acque marine":

Un'area marina, pur se meno interessata da diretta occupazione antropica, fa parte del paesaggio umano non meno della terrestre, come ribadito dalla stessa Convenzione all'art. 2: "la presente Convenzione si applica a tutto il territorio delle Parti e riguarda gli spazi naturali, rurali, urbani e periurbani. Essa comprende i paesaggi terrestri, le acque interne e marine. Concerne sia i paesaggi che possono essere considerati eccezionali, sia i paesaggi della vita quotidiana sia i paesaggi degradati".

La Convenzione sul paesaggio si applica quindi al "territorio" italiano ed, in particolare, alle "acque marine" del territorio italiano, come definito dalla legge italiana.

Prevede il secondo comma dell'art. 2 rubricato "mare territoriale" del Codice della navigazione che:

E' soggetta ... alla sovranità dello Stato la zona di mare dell'estensione di dodici miglia marine ...

La Convenzione sul paesaggio è quindi applicabile alle "acque marine" facenti parte del "mare territoriale" italiano della "estensione di dodici miglia marine".

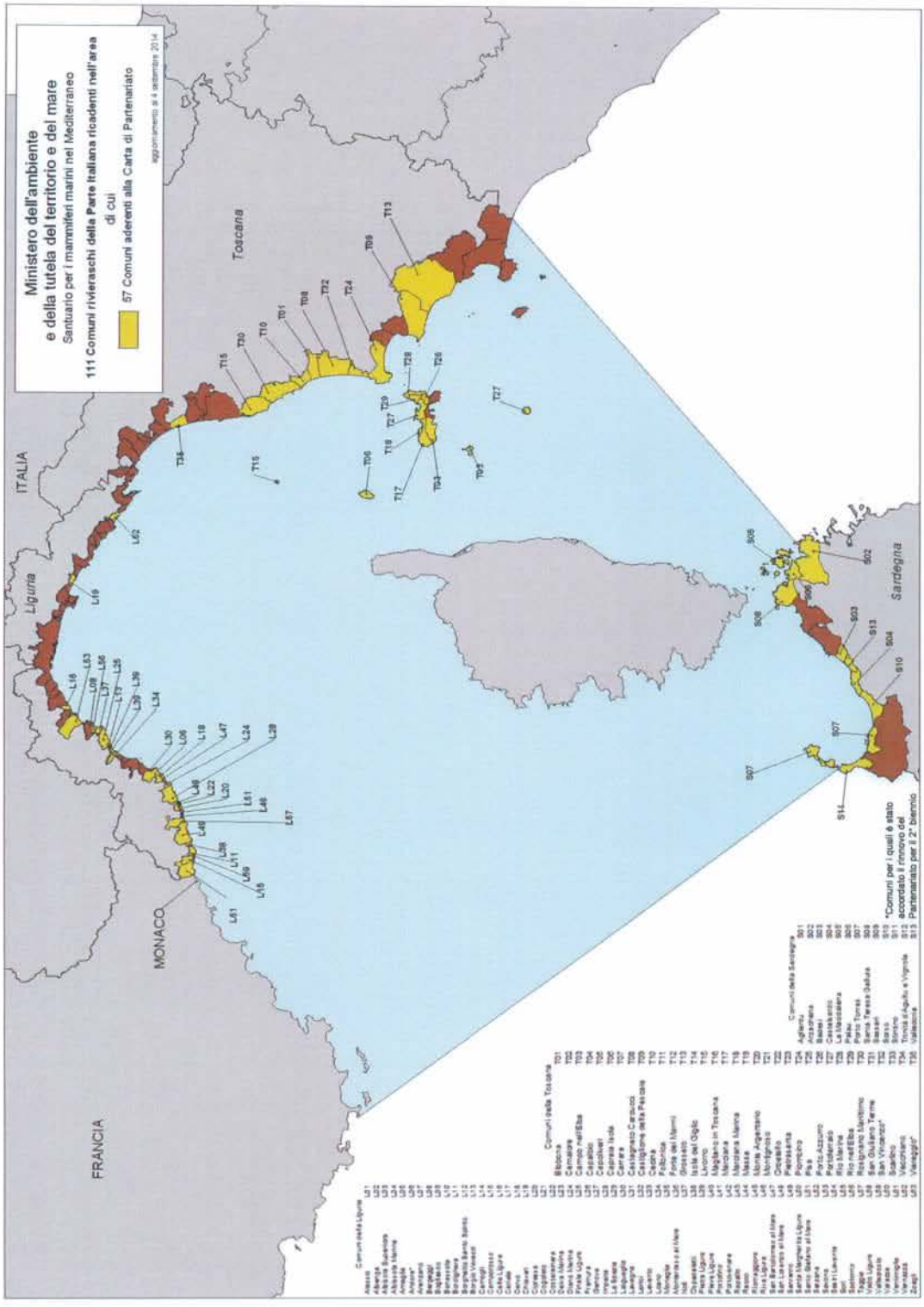
Ma, hanno evidenziato alcuni autori (Osservazione 5)

(Della) zona interessata, il lato più vicino dista dalle coste sarde 24.3 da Capo Argentiera e circa 33 miglia nautiche da Alghero.

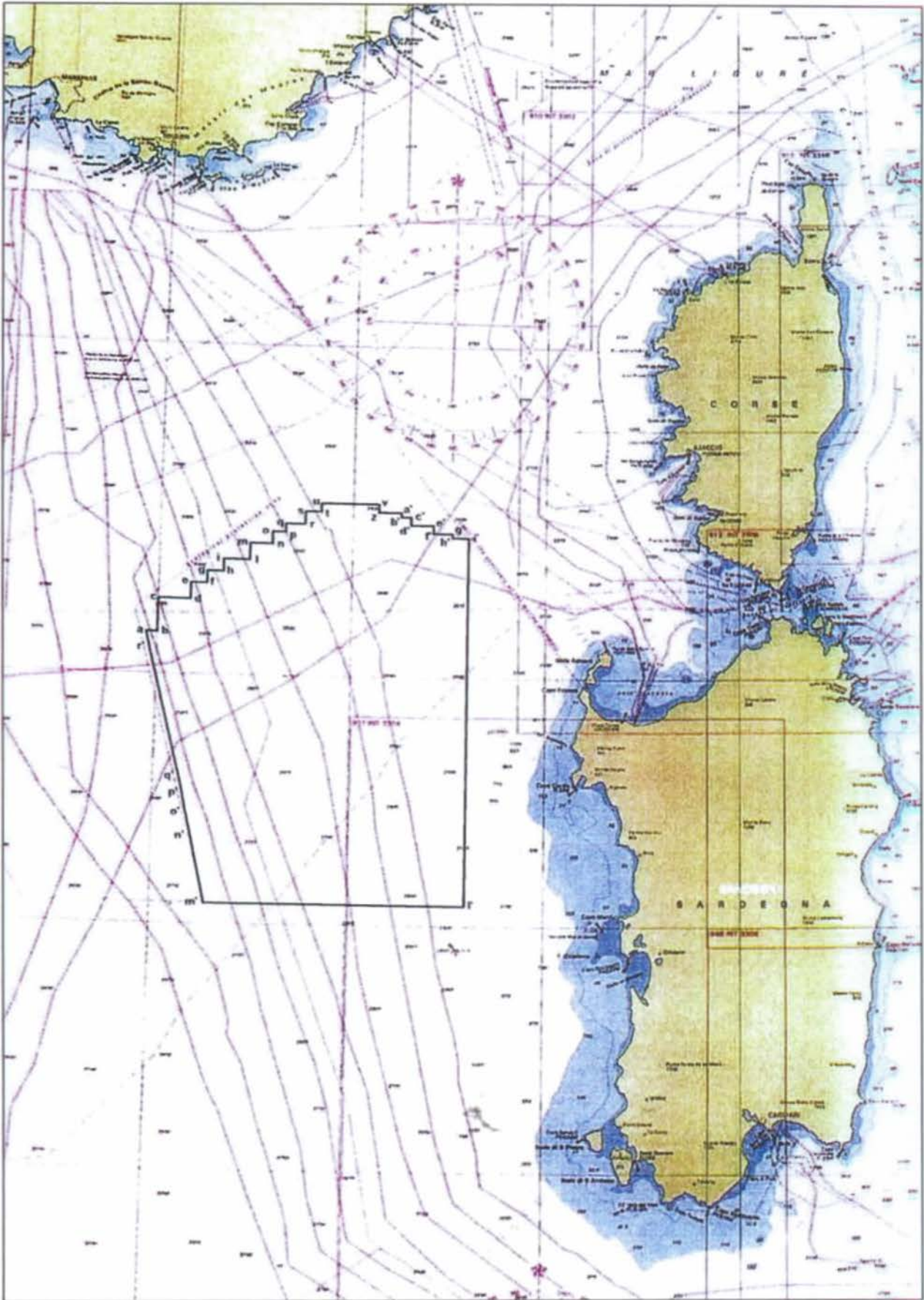
La Convenzione sul paesaggio è quindi inapplicabile alla zona di mare relativa al "permesso di prospezione" richiesto dalla Schlumberger, che dista dalle coste sarde 24.3 miglia marine da Capo Argentiera e 33 miglia marine da Alghero.

(Va considerato che l'Italia ha adottato il "miglio marino internazionale" che è "pari a metri 1852" (Articolo unico della Legge 7 aprile 1930, n. 538 recante "Lunghezza del miglio marino"). Pertanto, la zona di mare, relativa all'istanza di "permesso di prospezione" della Schlumberger, dista (24.3 (miglia marine) x 1.852 (metri) =) 45 km da

Capo Argentiera e (33 (miglia marine) x 1.852 (metri) =) 61.11 km da
Alghero).



- Comuni della Liguria**
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- Comuni della Toscana**
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- Comuni della Sardegna**
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Tav. 1 - Istanza di permesso di prospezione «d 1 E.P.-SC»

**GUIDELINES TO ADDRESS THE IMPACT OF
ANTHROPOGENIC NOISE ON CETACEANS IN THE
ACCOBAMS AREA**



ACCOBAMS Permanent Secretariat
www.accobams.org

General guidelines

Mitigation procedures should be practical in that they should use data that can be readily collected by cetacean observers, account for operating conditions and constraints, and, as far as possible, minimize disruption of operations while maximizing environmental protection.

Besides procedures for specific activities, the following guidelines and concepts should be taken into account for any activity:

- a) Consult databases of cetacean spatial and seasonal distribution and habitat databases so that activities can be planned and conducted to avoid critical habitats and when and where animals are unlikely to be encountered
- b) Collect information and, if required, organize surveys (shipboard and/or aerial) or monitoring with fixed detectors (buoys, bottom recorders, etc.) to assess the population density in the areas chosen for operation
- c) Avoid cetaceans' key habitats and marine protected areas, define appropriate buffer zones around them; consider the possible impact of long-range propagation
- d) Closed areas should be avoided and surrounded by appropriate buffer zones
- e) Consider cumulative impacts not just of noise but of all anthropogenic threats over time; consider effects modelling; include consideration of seasonal and historical impacts from other activities (shipping, military, industrial, other seismic) in the specific survey area and nearby region. For these purposes, databases/GIS that track the history of sonar/seismic and other industrial activities and anthropogenic threats should be developed
- f) Model the generated sound field in relation with oceanographic features (depth/temperature profile, sound channels, water depth, seafloor characteristics) to assess the area possibly affected by relevant impacts
- g) Determine safe / harmful exposure levels for various species, age classes, contexts, etc. This must be precautionary enough to handle large levels of uncertainty. When making extrapolations from other species, measures of uncertainty should quantify the chances of coming up with a wrong, and dangerous conclusion
- h) There should be a scientific and precautionary basis for the exclusion zone (EZ) rather than an arbitrary and/or static designation; exclusion zones should be dynamically modelled based on the characteristic of the source (power and directionality), on the expected species, and on the local propagation features (cylindrical vs spherical spreading, depth and type of sea bottom, local propagation paths related to thermal stratification). These EZ should be verified in the field
- i) In the case of multiple EZ choices, the safest, most precautionary option should be adopted
- j) Consider establishment of an expanded exclusion zone aimed at reducing behavioural disruption. This should be based on received levels much lower than those supposed to produce physiological and physical damage. Whenever possible, consider an expanded exclusion zone where exposure could be limited by reducing the emitted power (power-down) whilst maintaining acceptable operative capabilities
- k) Cetacean mitigation guidelines should be adopted and publicized by all operators, whether military, industrial or academic
- l) A system of automated logging of acoustic source use should be developed to document the amount of acoustic energy produced, and this information should be available to noise regulators and to the public
- m) Mitigation should include monitoring and reporting protocols to provide information on the implemented procedures, on their effectiveness, and to provide datasets to be used for improving existing cetacean databases
- n) During operations, existing stranding networks in the area should be alerted; if required, additional monitoring of the closest coasts and for deaths at sea should be organized

- o) If required, organize post cruise survey to verify if changes in the population density or anomalous deaths occurred as a possible consequence of operations (this requires a knowledge of the area before any operation has occurred – see points a & b)
- p) In the case of strandings possibly related with the operations, any acoustic emission should be stopped and maximum effort devoted to understanding the causes of the deaths
- q) In the case of abnormal behaviours observed in animals close to the operations, any acoustic emission should be stopped and maximum effort addressed at monitoring those animals
- r) Trained and approved Cetaceans Observers (visual observers and/or acoustic monitors where appropriate) should be employed for the monitoring and reporting program including overseeing implemented mitigation rules
- s) Cetacean observers and bio-acousticians in charge of the monitoring program must be qualified, dedicated and experienced, with suitable equipment
- t) Marine mammal observers should report to the National Focal Point that will inform the ACCOBAMS Secretariat using a standardized reporting protocol. Any unexpected condition and/or change in applied protocols should be discussed with the Secretariat in collaboration with the Scientific Committee.
- u) Accurate reporting is required to verify the EIA hypotheses and the effectiveness of mitigation
- v) Procedures and protocols should be based on a conservative approach that reflects levels of uncertainty. They should include mechanisms that create an incentive for good practice.
- w) Take a precautionary approach every time uncertainties emerge; in the case of unexpected events or uncertainties refer to the National Focal Point.

Guidelines for (military sonar and civil) high power sonar

For sonar operations the following guidelines and key concepts should apply in addition to the general guidelines:

- a) Sonar surveys should be planned so as to avoid key cetacean habitat and areas of cetacean density, so that entire habitats or migration paths are not blocked, so that cumulative sonar sound is limited within any particular area, and so that multiple vessels operating in the same or nearby areas at the same time are prohibited
- b) Use of the lowest practicable source power
- c) Adapt the sequencing of sonar lines to account for any predictable movements of animals across the survey area and avoid blocking escape routes
- d) Continuous visual and passive acoustic monitoring (PAM) with a specialized team of cetaceans observers and bio-acousticians to ensure that cetaceans are not in the “exclusion zone” before turning on the acoustic sources and while sources are active.
- e) Equipment for visual monitoring should include suitable binoculars, including big eyes, to be used according to the monitoring protocol
- f) High power sources should be restricted at night, during other periods of low visibility, and during significant surface-ducting conditions, since current mitigation techniques may be inadequate to detect and localize cetaceans. Because of the impact of adverse weather conditions on the visual detection of mammals, emission during unfavourable conditions should be restricted as well
- g) Passive acoustic monitoring (PAM) (towed array technology or other suitable technologies with enough bandwidth to be sensitive to the whole frequency range of cetaceans expected in the area) should be used to improve detection capabilities. PAM should be mandatory for night operations or when visibility is poor. However, PAM may be inadequate mitigation for night operations if cetaceans in the area are not vocal or easily heard.
- h) At least two dedicated Cetacean Observers should be on watch at every time on every operative ship; organize shifts to allow enough rotation and resting periods to MMOs. In case of acoustic monitoring, at least one operator should be on watch and shifts should be organized to allow 24/24h operation, unless automatic detection/alerting systems with proven effectiveness are available
- i) Before beginning any emission there should be a dedicated watch of at least 30 minutes to ensure no animals are within the EZ

- j) Extra mitigation measures should be applied in deep water areas if beaked whales have been seen diving on the vessel trackline or if habitats suitable for beaked whales are approached: in such cases, the watch should be prolonged to 120 minutes to increase the probability that deep-diving species are detected (e.g. Cuvier's beaked whales). Ideally, however, sonar exercises should not be done in areas that beaked whales are known to inhabit.
- k) Every time sources are turned on, there should be a slow increase of acoustic power (ramp-up or soft start) to allow cetaceans sufficient opportunity to leave the ensonified area in the event that visual and passive searches are unsuccessful. Ramp-up should be at least 30 minutes (the effectiveness of this procedure is still debatable)
- l) The beginning of emissions should be delayed if cetacean species are observed within the exclusion zone (EZ) or approaching it. Ramp-up may not begin until 30 minutes after the animals are seen to leave the EZ or 30 minutes after they are last seen (120 minutes in case of beaked whales)
- m) Avoid exposing animals to harmful acoustic levels by preventing them from entering into the EZ, by changing the ship course, if applicable, or by reducing (power-down) or ceasing (shut-down) the acoustic emissions
- n) Shut-down of source(s) whenever a cetacean is seen to enter the EZ and whenever aggregations of vulnerable species (such as beaked whales and sperm whales) are detected anywhere within the monitoring area

Guidelines for seismic surveys and airgun uses

Guidelines for mitigating the effects of seismic surveys have been experimented with mostly in the context of academic seismic surveys conducted under NMFS permits. Most of the following guidelines are equivalent to those required for sonar operations and should apply in addition to general guidelines:

- a) Seismic surveys should be planned so as to avoid key cetacean habitat and areas of cetacean density, so that entire habitats or migration paths are not blocked, so that cumulative seismic noise is limited within any particular area, and so that multiple vessels operating in the same or nearby areas at the same time are specifically regulated or prohibited.
- b) Use of the lowest practicable source power
- c) Limit horizontal propagation by adopting suitable array configurations and pulse synchronization and eliminating unnecessary high frequencies.
- d) Adapt the sequencing of seismic lines to account for any predictable movements of animals across the survey area and avoid blocking escape routes
- e) Modelling of the generated sound field in relation with oceanographic features (depth/temperature profile, water depth, seafloor characteristics) to dynamically set the Exclusion Zone. Confirm models by EZ tests in the field.
- f) Mitigation procedures should be practical in that they should use data that can be readily collected by cetacean observers during offshore operations, account for operating conditions and constraints of seismic surveys and, as far as possible, minimize disruption of surveys while maximizing environmental protection
- g) Continuous visual and passive acoustic monitoring (PAM) with a specialized team of cetacean observers and bioacousticians to ensure that cetaceans are not in the Exclusion Zone before turning on the acoustic sources and while sources are active.
- h) Equipment for visual monitoring should include suitable binoculars and big eyes to be used according to the monitoring protocol
- i) Ideally, high power airgun configurations should be prohibited at night, during other periods of low visibility, and during significant surface-ducting conditions, since current mitigation techniques may be inadequate to detect and localize cetaceans. Because of the impact of adverse weather conditions on the visual detection of mammals, emissions during unfavourable conditions should be restricted as well

- j) Passive acoustic monitoring (PAM) (towed array technology or other suitable technologies with enough bandwidth to be sensitive to the whole frequency range of cetaceans expected in the area) should be used to improve detection capabilities. PAM should be mandatory for night operations or when visibility is scarce. However, PAM may be inadequate mitigation for night operations if cetaceans in the area are not vocal or easily heard.
- k) At least two dedicated Cetacean Observers should be on watch at one time on every operative ship; shifts should be organized to allow enough rotation and resting periods to MMOs. In the case of acoustic monitoring, at least one operator should be on watch and shifts should be organized to allow 24/24h operation., unless automatic detection/alerting systems with proven effectiveness are available
- l) Before beginning any emission there should be a dedicated watch of at least 30 minutes to ensure no animals are within the EZ
- m) Extra mitigation measures should be applied in deep water areas if beaked whales have been seen diving on the vessel trackline or if habitats suitable for beaked whales are approached: in such a cases the watch should be at least 120 minutes to increase the probability that deep-diving species are detected (e.g. Cuvier's beaked whales).
- n) Every time sources are turned on, there should be a slow increase of acoustic power (ramp-up or soft start) to allow cetaceans sufficient opportunity to leave the ensonified area in the event that visual and passive searches are unsuccessful (the effectiveness of this procedure is still debatable)
- o) The beginning of emissions should be delayed if cetacean species are observed within the exclusion zone (EZ) or approaching it. Ramp-up may not begin until 30 minutes after the animals are seen to leave the EZ or 30 minutes after they are last seen (120 minutes in case of beaked whales)
- p) Exposing animals to harmful acoustic levels should be avoided by preventing them from entering the EZ, by changing the ship course, if applicable, or by reducing (power-down) or ceasing (shut-down) the acoustic emissions
- q) There should be a shut-down of source(s) whenever a cetacean is seen to enter the EZ and whenever aggregations of vulnerable species (such as beaked whales) are detected anywhere within the monitoring area
- r) If more than one seismic survey vessel is operating in the same area, they should maintain a minimum separation distance to allow escape routes between sound fields.
- s) Data sharing among surveyors should be encouraged to minimize duplicate surveying. Also, if old seismic data can be usefully re-analyzed using new signal processing or analysis techniques, this should be encouraged.

Guidelines for coastal and offshore construction works

Coastal and offshore construction works, which may include demolition of existent structures, may produce high noise levels, even for prolonged periods, depending on the technologies used and on local propagation features that include propagation through the substrate.

Construction works on the coast or on the shoreline, including harbours, may propagate noise (e.g. from pile drivers and jack hammers) over wide areas in particular where the substrate is rocky. Traditional percussive pile-driving produces vibrations that propagate well and can ensonify large marine areas at distances of more than 100km; in such conditions alternative technologies should be used. In some cases mitigation can be achieved through the use of bubble screens or material screens that attenuate sound emitted from the source or other technical modifications.

In the case of prolonged activities, such as construction works of large structures, a scheduling of the most noisy activities could be evaluated as a measure to avoid continuous exposures especially during critical periods for cetaceans living or transiting in the area; the concentration of noisy operations in short periods of time and alternative construction technologies should be also evaluated to minimize noise impacts.

- a) Modelling of the generated sound field in relation to geological and oceanographic features (depth/temperature profile, water depth, coastal and seafloor characteristics) should occur, in addition to verification in the field; the area where animals could receive harmful noise levels (Exclusion Zone) should be defined
- b) Noise producing activities should be scheduled according to the presence of cetaceans, if seasonal
- c) Alternative technologies should be used or countermeasures to reduce noise diffusion, i.e. bubble curtains should be adopted
- d) Noise monitoring stations at given distances from the source area should be set up to monitor for both local and long range noise levels and verify if predicted levels are reached or not
- e) Visual observation points/platforms to monitor for the presence and behaviour of cetaceans should be set up
- f) Before beginning any noise producing action there should be a dedicated watch of at least 30 minutes to ensure no animals are within the EZ
- g) In areas where water depths in the EZ exceed 200m the watch should be at least 120 minutes to increase the probability that deep-diving species are detected

It is also important to consider the noise that will be generated by the structures once they are operative. Bridges propagate vibrations related to the traffic; offshore wind-farms and oil extraction platforms produce their own noise and thus their environmental impact should be carefully evaluated and mitigated with dedicated rules.

Guidelines for offshore platforms

Offshore platforms may be used for a variety of different activities, such as seafloor drilling, oil/gas extraction, electricity production (wind-farms), each one with its own particular impacts on the marine environment. Their placement should be carefully regulated; if their impacts include noise, they should be required to undergo a specific implementation of monitoring and mitigation procedures to be defined on a case by case basis and separately for the construction phase and for the operative life. The growing number of windfarms in coastal areas may have an impact on cetaceans, in particular because of the noise they make. They should be designed and operated to produce the lowest possible noise in all activity phases.

Guidelines for Playback & Sound Exposure Experiments

Playback and Controlled Exposure Experiments (CEEs) are experiments in which animals in the wild are exposed to controlled doses of sound for the purposes of assessing their behavioural or physiological responses. CEEs are one of several methods that have historically been and are increasingly being applied to the study of cetacean behavioural responses to sound. These approaches can complement opportunistic observations or the tagging of animals around noise-producing activities. CEEs (which include some recent experiments under the generic heading of Behavioural Response Studies (BRS)), are designed to introduce small amounts of additional sound into the ocean in order to scientifically determine responses and assess the potential risk from human activities. However, playbacks may carry some risks themselves to target individuals and potentially expose not only the target species and/or individuals to be studied, but also additional ones. These considerations need to be carefully addressed through precautionary protocols in the execution of CEEs and the possible risks should be balanced against the potential for these studies to provide answers to management and/or scientific questions on a case by case basis.

Given that some CEEs can be controversial, and because of the known underlying concerns, it is particularly important that they are carefully designed and carefully conducted and their limitations and risks acknowledged. In order to achieve optimal scientific and conservation value, those involved in conducting, funding and managing large-scale CEE experiments should strive for international cooperation, coordination and very transparent information exchange and where possible joint programmes of work. Avoidance of duplicative or overlapping research will also help to prevent any unnecessary introduction of noise into the marine environment.

Controlled Exposure Experiments typically strive to use, without exceeding harmful levels, sound exposures that are as realistic as possible (relative to known human sound sources), but with the capability of close control over the type and nature of exposures. Many CEEs are designed to minimize the exposure required to elicit a detectable response. Opportunistic studies, on the other hand, involve actual sound sources and, thus, more realistic exposures, though the lack of experimental control in some circumstances can limit the power of resulting observations.

Both kinds of studies must include (or be preceded) by baseline studies of behaviour and physiology so that the results of the experiments are meaningful and can be properly interpreted. . To increase the utility of the results to regulatory decision-making, researchers conducting CEEs should openly communicate the design, procedures, and results of such studies to policymakers.

As with all biological research, methods that can yield conclusive results with less risk of harm to the animals should be preferred. Systematic observations using ongoing sound-producing activities should be used in place of CEEs if they can provide similar information with similar power to detect effects. It is noted, however, that the lack of experimental control over sources in opportunistic contexts, as well as the safety and/or national security considerations inherent in some situations can significantly limit their value in many real-world applications. Systematic studies of ongoing sound-producing activities can validate and strengthen monitoring efforts required as mitigation, and have the benefit that such studies do not introduce additional sound directed at the mammals. The advantages of both observational and experimental studies are increased as more attention is given to optimizing measurement methods and study designs with the greatest power to detect real effects and provide convincing results. In practice, research investigating the impacts of large sound sources could be most successful when using a suite of approaches including observations of both controlled and uncontrolled sound exposures. Therefore, controlled experiments and opportunistic observations are usually best seen not as alternatives, but rather as complementary approaches that yield the most powerful results when both are conducted.

Sound exposure experiments require an explicit protocol to manage possible interactions among the sound source(s) and the target(s); in general, while designing and conducting such experiments, these guidelines should be taken into consideration:

- use sound exposures that are as realistic as possible (while minimizing exposure required to detect responses) and with the same or similar characteristics of sound that the mammals are likely to be exposed to
- model sound propagation from the source to the targets based on local oceanographic features and background noise information
- use available technologies to monitor both target and non-target animals; monitor other individuals and species – which may require different methods but may provide additional information
- design experiments so that monitored animals are those exposed to highest levels
- halt sound emission if adverse response or behavioural changes are observed on either target or non target animals
- limit repeated exposures on the same target(s) unless required by the research protocol
- avoid enclosed areas, avoid blocking escape routes
- avoid “chasing” animals during playbacks; if they move away -- don’t modify the course to follow them with the playback source
- exposures that are expected to elicit particular behavioural responses (e.g., responses elicited by predator sounds, conspecific signals) may be particularly useful control stimuli in CEEs; however, such exposures should be used only as necessary as part of a careful experimental paradigm that includes specific mitigation and monitoring protocols. In such cases, it is important to consider that the response may not be related to the loudness of the exposure but to the behavioural significance of the signal used.

Guidelines for shipping

noise from ships should be evaluated both at close range for its direct possible effects on local marine life and at long-range for the contribute to background noise at low frequencies. It is still difficult to say how much the radiated noise should be reduced to get visible effects. However, noise reduction should be evaluated in order to reduce both local and long range effects (see quieting technologies).

Guidelines for other mitigation cases

Any activity that produces noise levels that may pose risks to cetaceans requires attention and the implementation of monitoring and mitigation procedures. Some of the cases reported in this chapter (touristic boats and whale watching) may not produce physical injuries; however they contribute to the underwater noise and may have a significant impact on the behaviour and welfare of the animals, and, in the long term, a negative effect on the local population. At least in sensitive areas these should be taken under control and eventually limited.

Touristic boats

Tourist traffic in some areas is becoming a serious problem; noise irradiated by engines and propellers is an important component of the disturbance to animals.

Tourist boats should avoid approaching dolphins and dolphins schools, as well as larger cetaceans, and especially if calves are present. Specific guidelines are already available and their distribution should be supported as much as possible.

In case of sensitive habitats and marine protected areas, the relevant authorities should severely restrict the use of tourist motorboats and eventually encourage the use quieter electric engine boats.

Boats should be as quiet as possible and noise controls should be made at the beginning of every field season. Noise limits should be set to reduce the behavioural disturbance to animals as much as possible.

Whale watching

Whale watching is an activity that is increasing every year and that may have an impact on cetacean populations, stocks, and individuals. Rules and permits are already in force in many countries, but the noise issue is seldom taken into consideration. Noise irradiated by engines and propellers is an important component of the disturbance to animals. Beyond complying with national rules and restrictions, whale watching operators should also comply with noise emission restrictions.

Boats should be as quiet as possible and noise controls should be made at the beginning of every field season. Noise limits should be set to reduce the behavioural disturbance to animals as much as possible.

Explosive disposal of residual war weapons, use of explosives for testing or for decommissioning structures

In many areas of the Mediterranean Sea the detonation of residual war weapons is a recurrent activity that needs special care; also explosives are used widely for offshore decommissioning of structures and for military trials, e.g. for testing ships and submarines.

In all such cases, the definition of an Exclusion Zone is required, based on the power of the expected explosion(s) and on the oceanographic features; consequently the EZ area should be monitored to be sure no animals are inside. The watch before starting operations should be at least 30 min, it should be prolonged to 120 minutes in areas where deep divers could be present. Additional measures could include the use of absorbing materials, e.g. bubble curtains that are proven to attenuate the shock wave or at least to dampen the shock wave onset. The use of aversive sound devices to remove animals from

the danger area for the relatively short period of blasting holds great promise for mitigation. However, further studies to develop and test such devices with the range of species of interest would be required before these could be relied on for mitigation.

Underwater acoustically active devices

Underwater acoustics is an expanding field and new acoustic technologies are continuously developed, tested and applied for a variety of uses, e.g. for searching/monitoring/exploiting environmental resources, for conducting scientific research, and for military purposes.

Examples of activities that may require a permit include: oceanographic experiments based on the use of high power acoustic sources, including the use of acoustic positioning devices, the use of deterrent devices (Pingers, Acoustic Deterrent Devices, and Acoustic Harassment Devices, in particular if used in array configurations), e.g. to protect commercial fisheries or to protect industrial water intakes (cooling systems).

In all cases where high noise levels are expected in areas with the potential presence of cetaceans, at least the following guidelines should apply:

- a) There should be modelling of the generated sound field in relation to oceanographic features (depth/temperature profile, water depth, coastal and seafloor characteristics) and verification in the field; the area where animals could receive harmful noise levels (Exclusion Zone) should be defined
- b) Activities should be planned for areas with low cetacean densities, avoiding wherever possible sensitive species, such as beaked whales, and sensitive habitats (e.g. breeding areas, nursing areas, etc.)
- c) Noise producing activities should be scheduled according to the presence/absence of cetaceans, if seasonal
- d) Noise monitoring stations should be set up to monitor for both local and long range noise levels and verify if predicted levels are reached or not
- e) Visual observation points or mobile platforms should be set up to monitor for the presence and behaviour of cetaceans
- f) PAM stations or mobile platforms should be setup to monitor for the presence and behaviour of cetaceans
- g) Before beginning any noise producing action there should be a dedicated watch of at least 30 minutes to ensure no animals are within the EZ

In areas where water depths in the EZ exceed 200m the watch should be at least 120 minutes to increase the probability that deep-diving species are detected.