

Appendix A: Agenda

AGENDA: Welcome & Day One

All sessions will be held in the Meeting House Conference Center. Lunch and breaks will be held at the Tiki Pavilion.

The framework for the presentations, discussion, and breakout groups is based on the Literature Synthesis that was completed prior to the workshop (and is available for download on the workshop website www.boemsoundworkshop.com). In addition to the Literature Synthesis, the workshop leads came up with key questions for discussion and review. These questions complement the sessions and are listed in this program beginning on page 9.

WELCOME: Monday, March 19, 2012	
8:00–9:30 p.m.	Registration and Meet and Greet Reception <i>Location: Tiki Pavilion</i>
Tuesday, March 20, 2012	
7:30–8:45 a.m.	Registration <i>Location: Outside of the Sunrise Room</i>
Session One: Introduction and Overview <i>Location: Sunrise Room</i> <i>Chair: Ann Pembroke, Normandeau Associates, Inc.</i> <i>Rapporteur: Jennifer Miksis-Olds, Penn State</i>	
9:00–9:15 a.m.	Introduction to Workshop, Purpose, and Goals <i>Ann Pembroke, Normandeau Associates</i>
9:15–9:40 a.m.	BOEM Introduction and Overview <i>Alan Thornhill, BOEM</i>
9:40–9:50 a.m.	Impact Statements and Regulatory Requirements for Offshore Developments <i>Kim Skrupky, BOEM</i>
9:50–10:10 a.m.	State of the Science—Introduction to the Literature Synthesis <i>Arthur N. Popper, University of Maryland and Anthony Hawkins, Loughine Ltd.</i>
10:10–10:30 a.m.	Questions and Discussion
10:30–11:00 a.m.	BREAK <i>Please assemble at the Tiki Pavilion at 10:35 a.m. for a group photo.</i>

Effects of Noise on Fish, Fisheries, and Invertebrates A BOEM Workshop on Data Gaps and Research Needs

Session Two: Priority Habitats, Species, and Fisheries Location: Sunrise Room Chair: Christopher Glass, University of New Hampshire Rapporteur: Joseph Luczkovitch, East Carolina University	
11:00–11:20 a.m.	Protected Species/Habitats <i>Craig Johnson, NOAA</i>
11:20–11:40 a.m.	Arctic Fisheries and Habitat <i>Steve MacLean, North Pacific Fishery Management Council</i>
11:40–12:00 p.m.	South Atlantic Fisheries and Habitat <i>Jaclyn Daly, NOAA, and Roger Pugliese, South Atlantic Fishery Management Council</i>
12:00–12:20 p.m.	North Atlantic Fisheries and Habitat <i>Kevin Friedland, NOAA</i>
12:20–12:40 p.m.	Questions and Discussion
12:40–2:00 p.m.	LUNCH (provided) Location: Tiki Pavilion
Session Three: Sources and Sound Exposure Location: Sunrise Room Chair: Roberto Racca, JASCO Applied Sciences Rapporteur: James Miller, University of Rhode Island	
2:00–2:20 p.m.	Measurements, Metrics, and Terminology <i>Michael Ainslie, TNO Defense, Security, and Safety</i>
2:20–2:50 p.m.	Sea Noise <i>Rob McCauley, Curtin University and Christine Erbe, Curtin University</i>
2:50–3:10 p.m.	Seismic Sources <i>Michael Jenkerson, Exxon Mobil Exploration Company</i>
3:10–3:40 p.m.	BREAK
3:40–4:00 p.m.	Pile Driving <i>James Reyff, Illingworth & Rodkin, Inc.</i>
4:00–4:20 p.m.	Wind Farms <i>Jeremy Nedwell, Subacoustech Ltd.</i>
4:20–4:40 p.m.	Other Anthropogenic Sources of Interest <i>Michael Ainslie, TNO Defense, Security, and Safety</i>
4:40–5:00 p.m.	Questions and Discussion
8:00–10:00 p.m.	LIGHTNING SESSIONS Location: Sunrise Room A rapid session of five minute, three-slide presentations on current research, ideas, and theories. Chairs: Arthur N. Popper, University of Maryland, and Anthony Hawkins, Loughine Ltd.

AGENDA: Day Two

Wednesday, March 21, 2012	
7:30–8:30 a.m.	Registration <i>Location: Outside of the Sunrise Room</i>
8:30–10:15 a.m.	<p style="text-align: center;">Breakout Groups For Session Three <i>Location: A: Sunset Room; B: Esquire Room; C: Towne Room</i></p> <p>A. Noise Generation: Characterizing Sources and Determining Exposure <i>Chair: James Miller, University of Rhode Island</i> <i>Rapporteur: Roger Gentry, E&P Sound and Marine Life Joint Industry Programme</i></p> <p>B. Noise Mitigation for Different Sources: Can Outputs be Reduced? Are There Quieter Alternatives? <i>Chair: Roberto Racca, JASCO Applied Sciences</i> <i>Rapporteur: James Reyff, Illingworth & Rodkin, Inc.</i></p> <p>C. Noise Measurements and Metrics that are Especially Relevant to Determining Sound Exposure: Including Cumulative and Aggregate Effects <i>Chair: Brandon Southall, Southall Environmental Associates, Inc.</i> <i>Rapporteur: John Stadler, NOAA</i></p>
10:15–10:45 a.m.	BREAK
<p>Session Four: Effects of Sound on Fishes and Invertebrates <i>Location: Sunrise Room</i> <i>Chair: Rob McCauley, Curtin University</i> <i>Rapporteur: Thomas Carlson, Battelle Pacific Northwest National Library</i></p>	
10:45–11:00 a.m.	Recap of Prior Sessions and Introduction <i>Ann Pembroke, Normandeau Associates, Inc.</i>
11:00–11:20 a.m.	Diversity of Fishes <i>Brandon Casper, University of Maryland</i>
11:20–11:40 a.m.	Invertebrates <i>Michel Andre, University of Catalonia</i>
11:40 a.m.–12:00 p.m.	Injury and Effects on Fish Physiology <i>Michele Halvorsen, Battelle PNNL</i>
12:00–12:15 p.m.	Questions and Discussion

12:15–1:15 p.m.	LUNCH (<i>provided</i>) <i>Location: Tiki Pavilion</i>
1:15–1:35 p.m.	Injury and Effects on Invertebrates <i>Jerry Payne, Department of Fisheries and Oceans</i>
1:35–1:55 p.m.	Importance of Sounds for Animals—Sound Production and Sound Detection: Changes in Behavior <i>David Mann, University of South Florida</i>
1:55–2:15 p.m.	The Auditory Scene, Communication, and Effects of Masking <i>Richard R. Fay, Loyola University Chicago</i>
2:15–2:35 p.m.	Behavior of Pelagic Fish in Response to Anthropogenic Sources <i>John Dalen, Institute of Marine Research</i>
2:35–3:00 p.m.	Questions and Discussion
3:00–3:30 p.m.	BREAK
3:30–3:50 p.m.	Responses of Fish to Ship Noise <i>Alex De Robertis, NOAA</i>
3:50–4:10 p.m.	Effects of Noise on Catches <i>Svein Løkkeborg, Institute of Marine Research</i>
4:10–4:30 p.m.	Assessing Effects of Noise on Catches: Statistical Approaches <i>Steven Murawski, University of South Florida</i>
4:30–5:00 p.m.	Questions and Discussion



Large Capelin

AGENDA: Day Three

Thursday, March 22, 2012	
Session Four: Effects of Sound on Fishes and Invertebrates, Continued <i>Location: Breakout Rooms—Esquire, Towne, Sunset</i>	
8:30–10:30 a.m.	<p style="text-align: center;">Breakout Groups For Session Four <i>Location: A: Esquire Room; B: Sunset Room; C: Towne Room</i></p> <p>A. Effects of Exposure to Sound on Catches <i>Chair, Alex De Robertis, NOAA</i> <i>Rapporteur, John Dalen, Institute of Marine Research</i></p> <p>B. What Do We Need to Know About Behavior of Wild Fishes and Invertebrates in Relation to Sound Exposure? <i>Chair, Rob McCauley, Curtin University</i> <i>Rapporteur, Michel Andre, University of Catalonia</i></p> <p>C. Injury, Physiological Damage, and Stress as a Result of Sound Exposure <i>Chair, Michele Halvorsen, Battelle PNNL</i> <i>Rapporteur, Jerry Payne, Department of Fisheries and Oceans</i></p>
10:30–11:00 a.m.	BREAK
Session Five: Conclusions <i>Location: Sunrise Room</i> <i>Chair: Jennifer Miksis-Olds, Penn State</i>	
11:00–11:15 a.m.	Recap of Prior Sessions and Introduction <i>Ann Pembroke, Normandeau Associates, Inc.</i>
11:15 a.m.–12:00 p.m.	Presentation from Session Three Breakout Groups on Sources and Exposure followed by General Discussion
12:00–1:00 p.m.	LUNCH (Provided) <i>Location: Tiki Pavilion</i>
1:00–1:45 p.m.	Presentation from Session Four Breakout Groups on Effects of Noise on Fishes and Invertebrates followed by General Discussion
1:45–2:15 p.m.	Information Needs and Data Gaps Identified at Workshop <i>Anthony Hawkins, Loughine Ltd</i>
2:15–3:15 p.m.	Questions and Discussion
3:15–3:45 p.m.	BREAK
3:45–4:15 p.m.	General Discussion
4:15–4:30 p.m.	Final Comments/Summary from BOEM <i>Alan Thornhill, BOEM</i>
4:30–4:45 p.m.	Workshop Closing <i>Ann Pembroke, Normandeau Associates, Inc.</i>

LIGHTNING SESSIONS

“**L**ightning” sessions held from 8 p.m. to 10 p.m. Tuesday evening will feature five-minute, three-slide presentations of current research, ideas the researchers want to discuss, theories, or anything else related to the overall interests of the workshop. The goal of these sessions is to allow people to share their current work with others. We hope that these short presentations will provide ideas and opportunities for discussion and interaction over the remainder of the workshop. Lightning session registration will remain open at the registration table until 5 p.m. on Tuesday, March 20.

LIGHTNING SESSION AGENDA

Name	Title	Affiliation	Lightning Session Title
Joseph Lafrate	Biologist	Naval Undersea Warfare Center - Newport	<i>Effects of Pile-Driving on Movement Behavior of Wild Reef Fish</i>
Brian Anderson	Vice President	Liquid Robotics, Inc.	<i>Wave Glider - An Unmanned Silent Passive Acoustic Monitor Platform</i>
Mark Liddiard	Business Manager	HR Wallingford Ltd	<i>Filling Data Gaps in a New 3D Predictive Noise Model</i>
Rick Bruintjes	Independent Research Fellow/Dr.	University of Bristol, UK	<i>The Impact of Boat Noise on Parental Behaviour in a Social Cichlid Fish</i>
Lars Petter Myhre	Leading Advisor	Statoil	<i>Fish Observations Using Rov From O&G Installation During Seismic Survey</i>
Michael Stocker	Director	Ocean Conservation Research	<i>Expressing Signal Characteristics as an Exposure Impact Factor</i>
Mark Wochner	Research Associate	Applied Research Laboratories, The University of Texas at Austin	<i>Underwater Noise Abatement Technology to Minimize the Impact of Industrial Activity on Marine Life</i>
Rodney Rountree	Senior Scientist	Marine Ecology and Technology App Inc	<i>Regional Catalogs of Biological Sound Sources: A Prerequisite to Understand Noise Impacts on Marine Ecosystems</i>
Jackson Gross	Biologist	USGS Northern Rocky Mountain Science Center	<i>Delayed Mortality and Barotrauma in Northern Pike Exposed to Water Guns</i>

Name	Title	Affiliation	Lightning Session Title
Robert Dooling	Professor of Psychology	Univ of Maryland	<i>What Do We Mean By 'Hearing'?</i>
Gail Scowcroft	Associate Director, Office of Marine Programs	University of Rhode Island	<i>Discovery of Sound in the Sea</i>
Ingebret Gausland	Consultant		<i>The IMR 1992 Nordkappbanken Study Revisited</i>
Alex De Robertis	Fisheries Research Biologist	Alaska Fisheries Science Center	<i>Radiated Noise Measurements of A Noise-Reduced Fisheries Research Vessel</i>
Brandon Casper	Postdoctoral Research Scientist	University of Maryland	<i>Summary of Recent Experiments on Effects of Pile Driving Exposure in Fishes</i>
Erica Dazey	Senior Marine Scientist	Geo-Marine, Inc.	<i>Bio-Acoustic Monitoring During Marine Construction Projects</i>
Petr Krysl	Professor	University of California, San Diego	<i>Angular Oscillation of Solid Scatterers in Response to Progressive Planar Acoustic Waves: Do Fish Otoliths Rock?</i>
Ted Cranford	Chief Scientist	Quantitative Morphology Consulting, Inc.	<i>Virtual Experiments in Bioacoustics: Fish, Sound, and Finite-Element Modeling</i>
Jeremy Nedwell	Director	Subacoustech Environmental Ltd	<i>The Use of Acoustic Modelling for Assessing Windfarm Impact</i>
Brandon Southall	President and Senior Scientist	Southall Environmental Associates; University of California, Santa Cruz	<i>Behavioral Response Study Methods Used in a Study off Southern California</i>