

# Croatia. Progress report on cetacean research, January to December 2009, with statistical data for the *calendar year* 2009

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This report summarises information obtained from:

Name of agency/institute	Abbreviation (use in rest of report)	Contact e-mail address
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Faculty of Veterinary Medicine, University of Zagreb	FVM	hrvoje.gomercic@vef.hr

## 1. SPECIES AND STOCKS STUDIED

IWC common name	IWC recommended scientific	Area/stock(s)	Items referred to
Common bottlenose dolphin	<i>Tursiops truncatus</i>	Adriatic Sea	2.1.1; 2.1.2; 2.2; 3.1.1; 4.2; 4.3; 7.3.2; 8
Short-beaked common dolphin	<i>Delphinus delphis</i>	Adriatic Sea	2.1.2.
Striped dolphin	<i>Stenella coeruleoalba</i>	Adriatic Sea	2.1.2.

## 2. SIGHTINGS DATA

### 2.1 Field work

#### 2.1.1 Systematic

Target species	Date	Area <sup>1</sup>	No. of sightings	Contact person/institute and references
Common bottlenose dolphin	17/7/2009	Central Adriatic Sea	1	Hrvoje Gomerčić/VEF
Common bottlenose dolphin	19/7/2009	Central Adriatic Sea	1	Hrvoje Gomerčić/VEF
Common bottlenose dolphin	13/1/2009 – 18/12/ 2009	North Adriatic Sea	90	Nikolina Rako/BWI
Common bottlenose dolphin	18/5/2009 – 14/9/2009	Central Adriatic Sea	65	Drasko Holcer/BWI

**BW:** The BWI is currently running two research projects on bottlenose dolphins in Croatian waters and cooperative project in Croatian and Slovenian waters headed by Morigenos NGO from Slovenia:

1. The Adriatic Dolphin Project - Lošinj, a long-term study on ecology and conservation of a resident bottlenose dolphin (*Tursiops truncatus*) community of about 120 individuals inhabiting the Cres-Lošinj archipelago in the northern Adriatic Sea. Surveys are carried out all year round from a 5.8 m long RIB equipped with an outboard 90 HP engine. Data on natural markings have been continuously collected since 1987, through

<sup>1</sup> Refers to the Croatian part of the Adriatic Sea

photo-identification. Behavioural study focusing on behavioural responses to boat traffic, study of the diet of the bottlenose dolphins and bio-acoustic monitoring are also conducted.

2. The Adriatic Dolphin Project - Vis, research on distribution, ecology and population size of bottlenose dolphins in the Central Adriatic Sea. The project collects data on natural markings through photo-identification since 2007. Surveys are carried out spring-fall season from a 5.8 m long RIB equipped with an outboard 90 HP engine. Genetic, biomarker and stable isotope analysis are also carried out on biopsy samples obtained during surveys.

3. Boat-based surveys, land-based surveys and standard photo-identification procedures were carried out in Slovenia and western coast of Istria (Croatia). A total of 25 sightings were recorded and 41 well-marked dolphins photo-identified.

**FVM:** The FVM is running the project “Save the last Adriatic dolphins” since 2000 in cooperation with the Society for Dolphin Conservation (Gesellschaft zur Rettung der Delphine, GRD) Germany. The project goal is the development and implementation of research methods for preservation of the bottlenose dolphin in the Adriatic Sea.

### 2.1.2 Opportunistic, platforms of opportunity

During 2009 BWI researchers were reported of a presence of a solitary dolphin in Vinodolski channel, North Adriatic, several times during June and July. On two occasions observations were conducted – on the 25<sup>th</sup> of June the dolphin was sighted from the boat and confirmed to be striped dolphin. On 17<sup>th</sup> of July the same animal was resighted from the land. On both occasions behavioural data was collected together with anecdotal reports from tourists and residents.

Primary species	Area	Data type/method	Collected by	Platform	Location of archive (if applicable)	Contact person/institute and refs
Striped dolphin	Selce, Vinodolski channel	Behavioural data, focal follow	BWI	boat	BWI	Nikolina Rako/BWI
Striped dolphin	Klenovica, Vinodolski channel	Behavioural data, focal follow	BWI	land	BWI	Nikolina Rako/BWI
Common bottlenose dolphin	approx. 200 m off the western tip of Scedro island	sighting	dedicated observer	sailing boat	GRD	Christian Schögler/GRD
Dolphin (species unsure)	43°38'50" N 15°36'20" E between Rt Ljuta and Kosmerka	sighting	dedicated observer	sailing boat	GRD	Alexander Vicenik/GRD
Dolphin (species unsure)	43°01'40" N 16°01'30" E west of Vis island	sighting	dedicated observer	sailing boat	GRD	Alexander Vicenik/GRD
Dolphin (species unsure)	44°37'875" N 14°19'774" E	sighting	dedicated observer	sailing boat	GRD	Hedwig Mönch, Blue Line Charter/GRD
Dolphin (species unsure)	43°40'40" N 15°34'00" E south of Samograd	sighting	dedicated observer	sailing boat	GRD	Alexander Vicenik/GRD
Common bottlenose dolphin	43°30'7"N 16°55'4" E /between HR Mulo and Smokvica Veli	sighting	dedicated observer	sailing boat	GRD	Gunter Jentsch/GRD

Dolphin (species unsure)	44°54'240" N 14°13'16" E	sighting	dedicated observer	sailing boat	GRD	Hedwig Mönch, Blue Line Charter/GRD
Dolphin (species unsure)	43°00'10" N 16°10'50" E south of Vis island, bay of U Stiniva	sighting	dedicated observer	sailing boat	GRD	Alexander Vicenik/GRD
Common bottlenose dolphin (probably)	45°22,8'N 12°31,7'E 5 sm south of Venice	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin	44°49'6"N 13°50'4" E /off Veruda Marina, Pula	sighting	dedicated observer	sailing boat	GRD	Gunter Jentsch/GRD
Common bottlenose dolphin	44°35'5"N 14°34'1"E	sighting	dedicated observer	sailing boat	GRD	Gunter Jentsch/GRD
Common bottlenose dolphin	44°39' N 14° 16' 16" E	sighting	dedicated observer	sailing boat	GRD	Gunter Jentsch/GRD
Common bottlenose dolphin (probably)	45°03'7"N 13°35,4'E off Rovinj	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin (probably)	45°50,0' N 13°48,6'E off Pula	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin (probably)	44°50,4' N 14°10,1'E Kvarneric	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin	44°49'4" N 14°04' E	sighting	dedicated observer	sailing boat	GRD	Gunter Jentsch/GRD
Common bottlenose dolphin	between the islands of Sipan and Lopud (Elafitic Islands off Dubrovnik)	sighting	dedicated observer	land	GRD	Melanie Balent/GRD
Common bottlenose dolphin (probably)	45°20,7' N 13°29,2' E	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin (probably)	45°10,1' N 13°31,8' E	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin	43°50'02" N 15°30'03" E Vrgada/Oblik islands near fish farm	sighting	dedicated observer	motor boat	GRD	Werner Kellerer/GRD
Common bottlenose dolphin	off the village of Ugljan on the island of Ugljan	sighting	project member	motor boat	GRD	Ulrike Kirsch/GRD
Common bottlenose	off the village of	sighting	project	motor boat	GRD	Ulrike Kirsch/GRD

dolphin	Kukljica on the island of Ugljan		member			
Dolphin (species unsure)	44°10'30" N 15°09'20" E	sighting	dedicated observer	motor boat	GRD	Walter Schimandl/GRD
Dolphin (species unsure)	44°11'30" N 15°07'20" E	sighting	dedicated observer	land	GRD	Walter Schimandl/GRD
Common bottlenose dolphin (probably)	45°14,1' N 13°06,8' E	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Dolphin (species unsure)	between Rab and mainland	sighting	dedicated observer	./.	GRD	Katrin Pertl/GRD
Common bottlenose dolphin	43°13,8'N 16°31,5 E	sighting	dedicated observer	sailing boat	GRD	A.+H. Grill/ GRD
Dolphin (species unsure)	44°06'50" N 15°13'20" E	sighting	dedicated observer	motor boat	GRD	Walter Schimandl/GRD
Common bottlenose dolphin	43°45'2" N 15°39'45" E	sighting	dedicated observer	motor boat	GRD	Gerd Schröter/GRD
Dolphin (species unsure)	southern tip of Murter island near Kukuljari	sighting	dedicated observer	./.	GRD	Frank Büttgen/GRD
Common bottlenose dolphin (probably)	44°52,6' N 14°10,7' E	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Dolphin (species unsure)	between Drevenik and Solta	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Dolphin (species unsure)	off Pucisca (Brac)	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Dolphin (species unsure)	43°9'N 16°52' E off Hvar island	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Dolphin (species unsure)	south of Hvar island	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Dolphin (species unsure)	Kornati National Park near Sestrica	sighting	dedicated observer	./.	GRD	Frank Büttgen/GRD
Dolphin (species unsure)	south of Lastovo	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Common bottlenose dolphin	44°53,5'59" N 14°50,24'39" E	sighting	dedicated observer	motor boat	GRD	Detlef Kühnen/GRD
Dolphin (species unsure)	between Zlarin and Primosten	sighting	dedicated observer	./.	GRD	Frank Büttgen/GRD
Common bottlenose	44°41' N 14° 52' E, between	sighting	dedicated observer	motor boat	GRD	Dominik Meierotte/GRD

dolphin	Rab and mainland ferry area)					
Dolphin (species unsure)	south of Brac island	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Dolphin (species unsure)	between Rab, Goli Otok and mainland	sighting	dedicated observer	boat	GRD	Sonja Schreiber/GRD
Common bottlenose dolphin	44°38'50" N 14°54'00" E	sighting	dedicated observer	motor boat	GRD	Martin Werdung/GRD
Dolphin (species unsure)	between the Kaprije and Murter islands	sighting	dedicated observer	./.	GRD	Frank Büttgen/GRD
Common bottlenose dolphin (probably)	44°35,1' N 14°00,4' E	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin	44°18'275" N 15°23'138" E between Starigrad + Ražanac Veli	sighting	dedicated observer	motor boat	GRD	A.+B. Kuntner/GRD
Dolphin (species unsure)	off Split	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Common bottlenose dolphin	43°45'44.59" N 15°22'35.85" Kornati National Park	sighting	dedicated observer	boat	GRD	Michael/GRD
Common bottlenose dolphin (probably)	entry Limfjord between Rovinj and Vrsar	sighting	dedicated observer	land (camping ground Kversada Vrsar)	GRD	Isolde Bätzner/GRD
Dolphin (species unsure)	south of Iz Veli	sighting	dedicated observer	sailing boat	GRD	D.+S. Moritz/GRD
Common bottlenose dolphin	43°49'47.02" N 15°30'36.34" off Vrgada island	sighting	dedicated observer	boat	GRD	Michael/GRD
Common bottlenose dolphin (probably)	entry Limfjord between Rovinj and Vrsar	sighting	dedicated observer	land (camping ground Kversada Vrsar)	GRD	Isolde Bätzner/GRD
Dolphin (species unsure)	44°56'36.39" N 14°33'46.24" E	sighting	dedicated observer	motor boat	GRD	Michael/GRD
Common bottlenose dolphin (probably)	entry Limfjord between Rovinj and Vrsar	sighting	dedicated observer	land (camping ground Kversada Vrsar)	GRD	Isolde Bätzner/GRD
Common bottlenose dolphin	off Stanice near Omis/Split	sighting	dedicated observer	land	GRD	J. Bude, G. Hofmann/GRD

Common bottlenose dolphin (probably)	44°45,9' N 13°56,9' E off Porer lighthouse	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin	off the Rab island	sighting	dedicated observer	motor boat	GRD	Peter Häfele/GRD
Common bottlenose dolphin	42°54'56"N 17°15'80" E	sighting	dedicated observer	sailing boat	GRD	Isabel Gärnter/GRD
Dolphin (species unsure)	44°56'36.39"N 14°33'46.24"E	sighting	dedicated observer	motor boat	GRD	Michael/GRD
Common bottlenose dolphin (probably)	entry Limfjord between Rovinj and Vrsar	sighting	dedicated observer	land (camping ground Kversada Vrsar)	GRD	Isolde Bätzner/GRD
Common bottlenose dolphin (probably)	45°32,5' N 13°36,7' E off Izola	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin (probably)	entry Limfjord between Rovinj and Vrsar	sighting	dedicated observer	land (camping ground Kversada Vrsar)	GRD	Isolde Bätzner/GRD
Common bottlenose dolphin	42°43'47"N 17°37'00" E	sighting	dedicated observer	sailing boat	GRD	Isabel Gärnter/GRD
Common bottlenose dolphin	between the islands of Korčula and Hvar	sighting	dedicated observer	sailing boat	GRD	Philipp Held/GRD
Common bottlenose dolphin (probably)	45°30,7' N 13°31,7' E off Piran	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Dolphin (species unsure)	44°57'11"N 14°30,32'04" between the islands of Cres and Plavnik	sighting	dedicated observer	motor boat	GRD	Norbert Köller/GRD
Common bottlenose dolphin or Short-beaked common dolphin	44°05'59"N 15°02'3"E	sighting	dedicated observer	sailing boat	GRD	Jil Rataj/GRD
Common bottlenose dolphin	43°29'462" N 16°24'489" E off Split harbor	sighting	dedicated observer	motor boat	GRD	Holger Kremeyer/GRD
Dolphin (species unsure)	Rab island (Bay of San Marino)	sighting	dedicated observer	motor boat	GRD	Tanja Breunig/GRD
Dolphin (species unsure)	43°37'435" N 15°42'278" E	sighting	dedicated observer	sailing boat	GRD	Wolfgang Corna/GRD
Common bottlenose dolphin (probably)	44°48,8' N 14°12,3' E Kvarneric	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose	44°47,2' N 14°07,0' E	sighting	dedicated	sailing boat	GRD	Bodo Meyer, DBM

dolphin (probably)	Kvarneric		observer			Yacht-charter/GRD
Dolphin (species unsure)	Rab island (Bay of Lopar)	sighting	dedicated observer	motor boat	GRD	Tanja Breunig/GRD
Common bottlenose dolphin	44°58'53"N 14°26'15"E off Merag/Cres island	sighting	dedicated observer	ferry	GRD	Christoph Roland/GRD
Dolphin (species unsure)	44°31'52,1" N 15°3'55,7" E off Karlobag	sighting	dedicated observer	land	GRD	Frank Winkler/GRD
Common bottlenose dolphin (probably)	off Stomorska bay on Šolta	sighting	dedicated observer	sailing boat	GRD	Susanne Hödl/GRD
Common bottlenose dolphin (probably)	44°05'5' N 13°37,0' E near Rovinj	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin	east coast Piskera/Kornati islands	sighting	dedicated observer	sailing boat	GRD	Gerold Knispel/GRD
Common bottlenose dolphin	43°50'42"N 15°28'00"E	sighting	dedicated observer	sailing boat	GRD	Philipp Held/GRD
Common bottlenose dolphin	Oruda - Palacol islands	sighting	dedicated observer	sailing boat	GRD	Wolfgang Schille
Common bottlenose dolphin	Dolfin island	sighting	dedicated observer	sailing boat	GRD	Wolfgang Schille
Common bottlenose dolphin (probably)	45°03'7' N 13°36,8' E near Rovinj	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin	Miljetski Kanal	sighting	dedicated observer	motor boat	GRD	Sabine Skala/GRD
Common bottlenose dolphin (probably)	43°11' N 16° 22' E Pelegrin	sighting	dedicated observer	motor boat	GRD	Sabine Skala/GRD
Common bottlenose dolphin (probably)	43°12' N 16° 27' E	sighting	dedicated observer	motor boat	GRD	Sabine Skala/GRD
Dolphin (species not indicated)	34°49'48" N 15°31'40" E East of the Murvenjak island	sighting	dedicated observer	sailing boat	GRD	Alexander Vicenik/GRD
Common bottlenose dolphin (probably)	45°10'4" N 13°33'6" E near Porec	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD
Common bottlenose dolphin (probably)	45°07'2" N 13°36'0" E off Limfjord	sighting	dedicated observer	sailing boat	GRD	Bodo Meyer, DBM Yacht-charter/GRD

## 2.2 Analyses/development of techniques

Target species	Date	Area	Methods/effort	Parameters/ factors measured	Contact person/institute; refs
Common bottlenose dolphin	13/1/2009 – 18/12/2009	North Adriatic Sea	Random line transect survey, Encounter Rates /km; Spatial analysis / km	Habitat use, encounter rate; relative density; survey effort (distance effort and time effort), behaviour, ambient noise	Nicolina Rako/BWI
Common bottlenose dolphin	18/5/2009 – 14/9/2009	Central Adriatic Sea	Random line transect survey, Encounter Rates /km; Spatial analysis / km	Habitat use, encounter rate; relative density; survey effort (distance effort and time effort)	Drasko Holcer/BWI

## 3. MARKING DATA

### 3.1 Field work

#### 3.1.1 Natural marking data

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
Common bottlenose dolphin	Dorsal fin	North Adriatic Sea	N/A	Y	527	Nicolina Rako/BWI
Common bottlenose dolphin	Dorsal fin	Central Adriatic Sea	N/A	Y	415	Drasko Holcer/BWI
Striped dolphin	Dorsal fin	North Adriatic Sea	1	Y	2	Nicolina Rako/BWI

#### 3.1.2. Artificial marking data

No artificial marking was carried out.

#### 3.1.3 Telemetry data

No telemetry studies were carried out.

## 3.2 Analyses/development of techniques

BWI:

Lošinj: The analysis of navigation data has shown the total distance covered by the research vessel was 3115.6 nm, distance covered 'in search' was 2437.14 nm, whilst distance 'in search' and in 'positive conditions' (sea state <2 according to the Douglas scale) was 2403.95 nm. Researchers spent 367.8 hrs in total on the sea; 178.22 hrs in search; 176.35 hrs 'in search' in 'positive effort'; and 84.63 hrs 'with' dolphins.

During dedicated surveys bottlenose dolphins (*Tursiops truncatus*) were encountered 88 times. Preliminary analysis based on field estimation showed average group size to be 6,5 dolphins, ranging between 1 and 50 dolphins.

Detailed analysis of the sightings data for 2009 is still ongoing.

Vis: Distance covered by research vessel was about 4160 km with total of 325 hours spent on the sea. During 46 dedicated surveys dolphins were encountered 65 times. Group size based on photo identification analysis showed average of 6 dolphins, ranging from 1 to 21 animals.



#### 4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

##### 4.1 Biopsy samples (summary only)

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Common bottlenose dolphin	Central Adriatic Sea	2009	Y	6	6	Drasko Holcer/BWI

##### 4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or bycatches

Species	Area/stock	Tissue type(s)*	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Common bottlenose dolphin	Central Adriatic Sea	skin, blubber, muscle, kidney, liver, spleen, lung	1	Y		Hrvoje Gomerčić/VEF

\*e.g. liver, skin, blubber ovaries, etc.

##### 4.3 Samples from stranded animals

Species	Area/stock	Tissue type(s)*	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Common bottlenose dolphin	Adriatic Sea	skin, blubber, muscle, kidney, liver, spleen, lung	7	Y		Hrvoje Gomerčić/VEF

\*e.g. liver, skin, blubber etc.

#### 4.4 Analyses/development of techniques

None.

#### 5. POLLUTION STUDIES

None.

#### 6. STATISTICS FOR LARGE CETACEANS

##### 6.1 Corrections to earlier years' statistics for large whales

None.

##### 6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2009

None.

##### 6.3 Anthropogenic mortality of large whales for the calendar year 2009

###### 6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)

None.

###### 6.3.2 Fishery bycatch of large whales

None.

#### 7. STATISTICS FOR SMALL CETACEANS

##### 7.1 Corrections to earlier years' statistics for small cetaceans

BWI:

Lošinj: The analysis of the photo-identification data for the period 2001 – 2008 is currently being carried out. This will result in corrected results for the given period. This work in progress is estimated to be finished by the end of 2010 and will be presented in future reports to IWC.

Vis: The analysis of the photo-identification data for the period 2007 – 2009 is currently being carried out. This will result in corrected results for the given period.

## 7.2 Direct catches of small cetaceans for the calendar year 2009

None.

## 7.3 Anthropogenic mortality of small cetaceans for the calendar year 2009

### 7.3.1 Observed or reported ship strikes of small cetaceans (including non fatal events)

None.

### 7.3.2 Fishery bycatch of small cetaceans

Species	Ratio of male to female (if known)	No.	No. extrapolated to fleet total (point estimate)	Range, CI or CV	Date of bycatch	Location (description or lat/long)	FAO statistical area (if known)	FAO area	Fate	Targeted species	Gear	How observed?	Source or contact
Common bottlenose dolphin	?	1			21/7/ 2009	44,816667 N; 14,033333 E			dead			necropsy	FVM
Common bottlenose dolphin	M	1			21/10/2009	43,908889 N; 15,496389 E			dead		GN	necropsy	FVM
Comments: Entangled in gear, cut off and sank.													

## 8. STRANDINGS

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Common bottlenose dolphin	9	8	Hrvoje Gomerčić/FVM	hrvoje.gomercic@vef.hr

## 9. OTHER STUDIES AND ANALYSES

**BWI: Acoustic monitoring** - allows to measure the extent of the anthropogenic pressure in the area of Lošinj - Cres archipelago by measuring the variation of man-made noise between tourist and non-tourist season and to verify its impact on bottlenose dolphin distribution in the archipelago. Acoustic research was undertaken according to the previously defined methodology (Richardson & Green 1995). Sea Ambient Noise was recorded on the 10 acoustic stations once during every month in non-tourist season and three times in period between June and August. During recordings, information on wind direction and sea state, distances to various vessels in the area and general background information were noted. The intention is to relate this anthropogenic pressure (in terms of noise and vessel presence) with the dolphin distribution in the archipelago.

**Behaviour study** - initiated in 2004 was continued in 2009 as well. The protocol for data collection was “group follow” while the sampling method was “focal group sampling” (Altmann, 1974; Mann, 1999). Behavioural state, as the predominant activity of the dolphins within a group, together with their formation were continuously observed and recorded every 3 minutes. Presence, type, size, speed, distance, direction and reaction of boats were also noted. Throughout 2009, behaviour of bottlenose dolphins was sampled 11 times. The analysis of the collected data is still to be analysed.

**Diet of bottlenose dolphins** – this study was conducted in 2004 and continued in 2009. Samples of stomach contents collected since 2005 were analyzed based on the otholits and compared to results from 2004. Also, a reference catalogue of local fish species, presenting possible prey was created. The catalogue contains 60 fish species.

## 10. LITERATURE CITED

BWI:

- Altman, J. 1974. Observational study of behaviour: sampling methods. *Behaviour* 49, 227–265.
- Bearzi, G., Polini, E. and Notarbartolo di Sciara, G. 1999. Diurnal behaviour of free-ranging bottlenose dolphins (*Tursiops truncatus*) in the Kvarnerić (northern Adriatic Sea). *Marine Mammal Science*, 15(4):1065-1097.
- Mann, J. 1999. Behavioural sampling methods for cetaceans: a review and critique. *Marine mammal science*, 15, 102–122.
- Richardson, W.J., Green, C.R.Jr., Malme, C.I. and Thompson, D.H. (1995). *Marine Mammals and Noise*. Academic Press San Diego, Ca, Academic Press

## 11. PUBLICATIONS

### 11.1 Published or 'In Press' papers only

BWI:

- Rako, N., Holcer and D., Fortuna, C.M. 2009. Long-term inshore observation of a solitary striped dolphin, *Stenella coeruleoalba* in the Vinodol Channel, Northern Adriatic Sea (Croatia). *Natura Croatica*, Vol. 18, No 2. 427-436.

*\*All published literature can be obtained directly from the BWI via [nikolina.rako@blue-world.org](mailto:nikolina.rako@blue-world.org)*

VEF:

- Škrčić, D., Đuras, M., Gomerčić, T., Galov, A., Lucić, H., Čurković, S., Vuković, S. and Gomerčić, H. 2009. Promjene zatiljnog zgloba u dobrog dupina (*Tursiops truncatus*) iz Jadranskoga mora. Occipital joint lesions in the bottlenose dolphin (*Tursiops truncatus*) from the Adriatic Sea. In: Zbornik sažetaka 10. hrvatskog biološkog kongresa. Proceeding of abstracts of the 10<sup>th</sup> Croatian biological congress. Hrvatsko biološko društvo 1885. Osijek, Croatia. September 14-20. (Besedorfer, V., Kopjar, N., Vidaković-Cifrek, Ž., Tkalec, M., Bauer, N., Lukša, Ž., eds.). 287-288.
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\*All unpublished literature can be obtained directly from the BWI via [nikolina.rako@blue-world.org](mailto:nikolina.rako@blue-world.org)

## Appendix 1. FOA fishing descriptions and codes

<b>FAO FISHING GEAR CATEGORIES:</b>		<b>FALLING GEAR</b>	
<b>SURROUNDING NETS</b>		Cast nets	FCN
With purse lines	PS	Falling gear (not specified)	FG
One-boat operated purse seines	PS1	<b>GILLNETS AND ENTANGLING GEAR</b>	
Two-boat operated purse seines	PS2	Set gillnets (anchored)	GNS
Without purse lines (lampara)	LA	Driftnets	GND
<b>SEINE NETS</b>		Encircling gillnets	GNC
Beach seines	SB	Fixed gillnets (on stakes)	GNF
Boat seines	SV	Trammel nets	GTR
Danish seines	SDN	Combined gillnet-trammel nets	GTN
Scottish seines	SSC	Gillnets and entangling gillnets (not specified)	GEN
Pair seines	SPR	Gillnets (not specified)	GN
Seine nets (not specified)	SX	<b>TRAPS</b>	
<b>TRAWLS</b>		Stationary uncovered pounds nets	FPN
Bottom trawls	TBB	Pots	FPO
Beam trawl	OTB	Fyke nets	FYK
Otter trawls (side or stern)	PTB	Stow nets	FSN
Pair trawls	TBN	Barriers, fences, weirs, etc	FWR
Nephrops trawls	TBS	Aerial traps	FAR
Shrimp trawls (not specified)	TM	Traps (not specified)	FIX
Midwater trawls		<b>HOOKS AND LINES</b>	
Otter trawls (side or stern)	OTM	Handlines and pole-lines (hand operated)	LHP
Pair trawls	PTM	Handlines and pole-lines (mechanised)	LHM
Shrimp trawls	TMS	Set longlines	LLS
Midwater trawls (not specified)	TM	Drifting longlines	LLD
Otter twin trawls	OTT	Longlines (not specified)	LL
Otter trawls (not specified)	OT	Trolling lines	LTL
Pair trawls (not specified)	PT	Hooks and lines (not specified)	LX
Other trawls (not specified)	TX	<b>GRAPPLING AND WOUNDING</b>	
<b>DREDGES</b>		Harpoons	HAR
Boat dredges	DRB	<b>HARVESTING MACHINES</b>	
Hand dredges	DRH	Pumps	HMP
<b>LIFT NETS</b>		Mechanised dredges	HMD
Portable lift nets	LPN	Harvesting machines (not specified)	HMX
Boat-operated lift nets	LNB	<b>MISCELLANEOUS GEAR</b>	MIS
Shore operated stationary lift nets	LNS	<b>RECREATIONAL FISHING GEAR</b>	RG
Lift nets (not specified)	LN	<b>GEAR NOT KNOWN OR NOT SPECIFIED</b>	NK
		<b>SHARK CONTROL NETS</b>	NSC
		<b>DERELICT FISHING GEAR</b>	