Communication among Bottlenose Dolphins around Mikura Island, Japan
Summary Report to the M.I.K. – 15 May – 25 June 2002

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1) LIVING/WORKING ON MIKURA

Arrival on Mikura on **15 June 2002**. Departure from Mikura on **25 June 2002**.

22 June 2002 – Iruka Workshop for Mikura Island's Junior High and Elementary School Children, and other interested persons.

23 June 2002 – Participate in Iruka Festival.

During my stay on Mikura, I worked with Kogi-san, Sakai-san, Masaki-san, Hasegawa-san and several Kenkyukai members. I was lucky enough to ride several of the Mikura boats. Thank you.

The duration of my field season this summer included 17 days in May and 20 days in June (Table 1). I gathered data on videotapes whenever it was possible to go to sea. I worked on dolphin identifications from video with Sakai-san, Masaki-san and Imamura-san when sea conditions pre-empted boat trips.

We confirmed 110 individual dolphins from the videotapes that I recorded (Table 2). Dolphin ID numbers with respective age categories and sex determination(s) are from the M.I.K. database.

2) PURPOSE OF 2002 DATA COLLECTION:

Each season represents a continuation of my research on communication among bottlenose dolphins around Mikura Island, Japan. Dolphins are long-lived social mammals: to best understand their social structure, the affect of kinship on interactions, and use of signals to communicate requires long-term studies. The data gathered this summer add to the information already possessed by both the MIK and DCP (Dudzinski).

a) 2nd year continuation of a DCP project: ECD – echolocation click detector.
Preliminary data were gathered in 2001 and analyzed during the fall and winter months. Dudzinski gave a lecture on this data at the EAAM 2001 Symposium in Denmark. Past research on captive dolphin echolocation has provided much information on the production and potential uses for echolocation. A greater understanding of how dolphins use echolocation in search and detection tasks has resulted; however, we still know very little about how dolphins use echolocation in the wild. We know they use sonar to efficiently forage, navigate short distance, and investigate and monitor their environment, and to communicate. Some conclusions from last year's data: Acoustic behavior within echolocation pulses seems related to age, sex, and other visual behaviors. Younger dolphins click more than older dolphins. Energy shifts between 70 and 120 kHz were evident

b) New during the 2002 Field Season:

b1) Using a photographer's Light Meter to measure relative light levels.
DCP has been observing dolphins underwater in the Bahamas and in Japan for several years. Roughly, three times as many sounds have been recorded from bottlenose dolphins around Mikura Island than from Atlantic spotted dolphins from the Bahamas. Water clarity and light levels are greater on average in the Bahamas than at Mikura, though systematic measures were not gathered

previously. Bottom topography and distance from shore vary significantly between both places. Behavioral activities vary but not significantly.

During the 2002 field season at both sites, we used a spot meter to record consistent light meter readings at 1.0 and 2.0 m in three directions: horizontal, vertical up and down. These readings coupled with data on dolphin behavior and sounds facilitates an examination of how available light, visibility, and water turbidity affect the use of auditory versus visual signals by communicating dolphins.

b2) Two MS students, Psychology Department, University of Southern Mississippi

In December 2001, I became Adjunct Faculty in Psychology at the University of Southern Mississippi. Currently, I co-advise two students, Robin Paulos and Joana Ramos with Dr. Stan Kuczaj. They will be using data that I gathered over the past 12 years and assisting with continuing data collection to obtain their master's degrees. Joana and Robin visited Mikura for the last ~10 days of May to be introduced to the dolphins, MIK, and my friends and supporters on Mikura. Robin will study behavioral development of dolphins while Joana will study their sounds. Both will compare data between spotted dolphins of the Bahamas and the Mikura bottlenose dolphins. Comments from Robin & Joana follow:

Robin: I would first like to thank the people of Mikura for their generosity and hospitality. I was overwhelmed not only by the natural beauty of the island, but also by the kindness displayed by its inhabitants. The time spent on Mikura was a wonderful learning experience. I will be using data that Kathleen has collected in Japan as well as in the Bahamas in my Master's thesis, so to see firsthand how the data is gathered and processed is very helpful. For me, understanding each piece of the puzzle is crucial in determining how it all fits together. My primary area of interest is non-vocal communication and my thesis project will look at non-vocal communication in two species of dolphin; *Tursiops aduncus* in Japan and *Stenella frontalis* in the Bahamas.

Joana: For my thesis, I will categorize whistles produced both by bottlenose dolphins in Mikura and spotted dolphins in the Bahamas. Dolphins produce several whistles in a variety of contexts; however, the repertoire of wild dolphins is not known. Does each dolphin produce unique whistles? Or do dolphins share a common repertoire of whistles? Are the whistles produced by dolphins in Mikura different from those produced by dolphins in the Bahamas? In order to answer these questions, I will classify whistles into separate groups. My trip to Mikura was a dream come true. Although I have been doing dolphin research for almost a year, this was the first time I had the opportunity to swim with wild dolphins. When I got into the water for the first time, the scientist in me simply vanished and I once more became a little girl, who used to dream about dolphins. I was dazzled, amazed, with the animals around me. And it was not only the dolphins that impressed me in Mikura. I was overwhelmed with the kindness of the people of Mikura. I was really delighted to experience a little of the Japanese culture, and to try the delicious foods. I would like to thank everybody in the island for being so nice and thoughtful.

3) PRELIMINARY RESULTS

Data are collected on videotape while swimming among dolphins. Where and when each group was sighted and recorded are documented for each video sequence. Copies of these sighting records and VHS copies of Dudzinski's videotapes will be sent to MIK before fall, 2002. A list of ID's confirmed from Dudzinski's videotapes was given to Kogi-san, Sakai-san, and Masaki-san on CD as an excel file. Early details of the data gathered this summer

are presented below. At least 110 individual dolphins were identified this summer from my videotapes: 34 FA, 16 FS, 8 MA, 46 MS, 2 FJ, 3 MJ, and 1 XJ. Several calves from last year showed reliable scars and marks for re-identification. During my tenure on Mikura this year, we documented 5 new calves from the following females: 151FA, 065FA, 058FA, 064FA, and 032FA. The first four FA dolphins had their calves in May; the last had her calf in June.

Table 1. Summary of research effort, May & June 2002, studying dolphin communication at Mikura Island.

# Boat trips:	27 trips total (from 18 May – 19 June) Note: Kathleen was on 18 trips. Kathleen's two students participated on research trips in late May: Robin (7 trips) and Joana (2 trips).
# minutes on effort:	36 hours, 21 minutes (2,181 min. on the water) (time/boat trip looking for, observing dolphins, = duration of all boat trips combined)
# minutes of video:	~374 minutes (recorded on 14 video tapes) 17.15 % is the return on effort is (video min./effort min)x100 **This is the highest return on effort for any of Dudzinski's field seasons. **
# minutes of ECD data:	~391 minutes (recorded on 12 audio tapes) The ECD data refers to audio data gathered from dolphins. This audio data are the dolphin echolocation clicks at two different frequencies (kHz).

Table 2. ID numbers of the dolphins identified from Dudzinski/DCP videotapes. The number in parentheses represents the total count seen for that age/sex category.
(only ID #'s listed to save space, ID data courtesy M.I.K.)

FA		MA		MS			FS	J	X
(#)		(#)		(#)			(#)	(#)	(#)
001	058	038MA	004	046	231	403	083	351FJ	451
023	059	062MA	006	053	237	405	145	407FJ	
025	060	089MA	008	054	240	452	161		
027	061	090MA	010	055	241	453	219		
028	063	097MA	011	067	259		223	401MJ	
030	064	176MA	012	078	263		260	408MJ	
032	065	182MA	014	084	271		272	454MJ	
033	066	213MA	015	101	303		301		
035	068	094FA	016	152	306		309		
037	072	099FA	024	165	355		310		
041	073	143FA	034	212	358		311		
052	080	151FA	036	217	361		350	404FS	
056	081	178FA	044	226	400		353	455FS	
057	086	314FA	045	230	402		356		

4) UPDATES WILL BE SENT …
Questions on this summary report: Please let me know if you have any concerns of questions about the information in this report. My mailing address is below. I can read

(albeit slowly) hiragana and katakana, but not kanji. So, feel free to write in anything but kanji. Thanks.

Analyses report (~ 2/2003):

During the coming fall and winter months, with the help of Robin and Joana and DCP interns, I will analyze data: categorizing behaviors recorded on videotape and digitizing sounds for further computer analysis. I will send an update on our results to you in late February 2003.

5) SUMMER 2003

Assuming it is acceptable to Mikura residents and my science colleagues on Mikura and in Japan, we plan to return to Mikura in the late spring or early summer of 2003 (for about 2 months). We will continue DCP's studies of dolphin communication, patterns of echolocation use, and changes in these and other behaviors with development of dolphins.

6) ACKNOWLEDGMENTS

Captains (boats): Michio-san (Koueki-maru), Yoshinori-san (Houkou-maru), Souji-san (Dai-5-Souei-maru), Nobuo-san (Dai-8-Souei-maru), Kogi-san (Kaiou-maru)

I thank Hishi-san and Kuroda-san (MIK) for helping me find a house, for welcoming me to Mikura, and for agreeing to let me use and refer to the ID information archived by M.I.K.

Sakai-san, Masaki-san, and Imamura-san assisted with confirming dolphin ID's from my videotapes.

I thank all the friends I have on Mikura for their generosity and goodwill, and for often sharing delicious treats with me. Thank you to the students for welcoming me to their classrooms. I very much enjoyed the workshop and the Iruka Festival. I look forward to speaking more with you next summer.