Table 4.5.1: (a) Mangrove areas and status of occurrence of major species off Gujarat.
(b) Composition and ecological status of mangroves and obligate halophytes off Mundra.

(a)*

District	**1992**	**1998**
Mangroves areas (km^2)		
Kachchh	601.8	938.0
Jamnagar	13.12	98.3
Junagad	0.8	0.3
Bhavnagar	14.5	6.2
Bharuch	10.9	17.1
Surat	7.8	5.0
Valsad	-	5.0
Total	**767.0**	**1066.9**
Status of occurrence of major species		
Species	**1950**	**1998**
Avicennia	Common	Common
Rhizosolenia	Common	Vulnerable
Aegiceras sp	Common	Endangered
Ceriops tagal	Common	Vulnerable
Sonneratia apetala	Common	Vulnerable
Bruigeria sp.	Common	Absent
*** Based on satellite data**		

(b)*

Species	**Habit**	**Habitat**	**Ecological status**
Mangroves			
Avicennia marina	Tree, shrubs	Intertidal	Dominant
Rhizophora mucronata	Tree	Intertidal	Stray
Salvodora persica	Tree, shrubs	Supralittoral	Common
Obligate Halophyta			
Sesuvium portulacastrum	Runner	Lower Supralittoral	Common
Salicarnia brachiata	Shrub	Supralittoral	Common
Sueda maritime	Shrub	Supralittoral	Rare

Table 4.5.2: Range and average of phytopigment (parenthesis) at different stations off Vandh during December 2008.

Station	Chlorophyll *a* (mg/m^3)		Phaeophytin (mg/m^3)		Chl *a*/Phaeo	
	S	B	S	B	S	B
1	2.8-2.9 (2.9)	2.5-2.6 (2.6)	1.3-1.5 (1.4)	1.0*	1.8-2.2 (2.0)	2.5*
2	1.0-4.7 (2.8)	1.0-5.9 (2.9)	0.7-1.7 (1.0)	0.2-2.0 (1.0)	1.6-5.3 (3.1)	1.6-4.9 (3.5)
3	1.6*	1.7-1.9 (1.8)	0.4*	0.2*	3.7-4.4 (4.0)	7.2-9.0 (8.1)
4	0.8-0.9 (0.9)	0.7-0.8 (0.8)	0.3-0.5 (0.4)	0.2-0.4 (0.3)	1.7-2.9 (2.3)	1.9-3.7 (2.8)
5	0.7-0.9 (0.8)	0.9-1.0 (1.0)	0.3-0.4 (0.4)	0.5-0.6 (0.6)	2.0-2.1 (2.1)	1.7-1.8 (1.8)
6	0.6-0.7 (0.7)	0.5-0.6 (0.6)	0.3*	0.2-0.5 (0.4)	1.9-2.3 (2.1)	1.3-2.4 (1.9)

Note: - * Indicate similar value for all replicates.

Table 4.5.3: Range and average (parenthesis) of phytoplankton population at different stations off Vandh during December 2008.

Station	Date	Cell count (nox10^3/l)		Total genera (no)		Major genera	
		S	B	S	B	S	B
1	02.12.08	656.0*	473.6*	16*	15*	*Fragilaria* *Thalassiosira* *Thalassionema* *Navicula*	*Fragilaria* *Thalassionema* *Navicula* *Thalassiosira*
2	03.12.08	148.0-1922.4 (1035.2)	118.4-6432.8 (3275.6)	14-16 (15)	13-16 (15)	*Fragilaria* *Thalassiosira* *Peridinium* *Nitzschia*	*Fragilaria* *Thalassiosira* *Navicula* *Nitzschia*
3	04.12.08	165.6*	172.0*	17*	15*	*Fragilaria* *Thalassiosira* *Skeletonema* *Navicula*	*Fragilaria* *Thalassiosira* *Nitzschia* *Bacteriastrum*
4	02.12.08	40.0*	39.6*	18*	16*	*Fragilaria* *Peridinium* *Thalassiosira* *Thalassiothrix*	*Fragilaria* *Peridinium* *Melosira* *Thalassiosira*
5	04.12.08	32.8*	36.8*	15*	15*	*Fragilaria* *Thalassiosira* *Pleurosigma* *Navicula*	*Fragilaria* *Melosira* *Thalassionema* *Biddulphia*
6	04.12.08	62.4*	40.0*	19*	18*	*Fragilaria* *Melosira* *Thalassionema* *Leptocylindrus*	*Fragilaria* *Melosira* *Thalassionema* *Thalassiosira*

Note: - * Indicate similar value for all replicates.

Table 4.5.4: Distribution of phytoplankton population at different stations off Vandh during December 2008

Algal Genera	STATION					
	1	2	3	4	5	6
Amphiprora	+	-	-	-	-	-
Amphora	-	+	+	-	-	+
Bacteriastrum	-	+	+	+	+	+
Biddulphia	+	+	+	+	+	+
Campyloneis	-	+	-	-	+	+
Ceratium	-	-	-	-	+	+
Ceratoulina	+	-	-	-	-	-
Corethron	-	+	+	+	+	+
Coscinodiscus	+	+	+	+	-	+
Cyclotella	+	+	+	+	+	+
Diploneis	-	-	-	-	+	+
Ditylium	+	+	-	-	-	-
Fragillaria	+	+	+	+	+	+
Guinardia	-	+	+	+	-	+
Leptocylindrus	-	+	+	+	+	+
Licmophora	-	-	+	-	-	-
Lithodesmium	+	+	+	+	+	+
Melosira	+	-	-	+	+	+
Navicula	+	+	+	+	+	+
Nitzschia	+	+	+	+	-	+
Peridinium	+	+	+	+	+	+
Planktoniella	-	+	+	+	-	+
Pleurosigma	+	+	+	+	+	+
Prorocentrum	+	+	+	+	+	+
Rhizosolenia	+	+	-	+	+	+
Skeletonema	-	-	+	-	-	-
Streptotheca	-	+	+	+	+	+
Surirella	+	+	+	-	+	+
Thalassionema	+	+	+	+	+	+
Thalassiosira	+	+	+	+	+	+
Thalassiothrix	+	+	+	+	+	+
Total genera	**19**	**24**	**23**	**21**	**21**	**26**

Table 4.5.5: Range and average (parenthesis) of zooplankton production off Vandh during December 2008.

Station (Date)	Biomass (ml/100 m^3)	Population (nox10^3/100 m^3)	Total groups (no)	Major group (%)
1 (02.12.08)	7.3-11.8 (9.6)	83.3-86.2 (84.8)	14-18 (16)	Copepods (82.4) decapod larvae (9.4) chaetognaths (2.5) foraminiferans (2.1) polychaetes (1.3) gastropods (1.3) appendicularians (0.6) ostracods (0.2) siphonophores (0.1) others (0.1)
2 (31.12.08)	1.1-8.6 (3.6)	2.3-27.8 (11.8)	12-19 (16)	Copepods (65.6), decapod larvae (22.0), chaetognaths (3.0), polychaetes (2.4) foraminiferans (2.1), gastropods (1.1) appendicularians (1.1) siphonophores (0.8) fish eggs (0.6) heteropods (0.4) ostracods (0.4) lucifer sp. (0.2) fish larvae (0.1) lamellibranchs (0.1), others (0.1)
3 (04.12.08)	1.8-2.9 (2.4)	11.3-21.7 (16.5)	14-14 (14)	Copepods (67.5), decapod larvae (25.9) gastropods (4.1), chaetognaths (1.0), foraminiferans (0.7), siphonophores (0.3), polychaetes (0.1), appendicularians (0.1) lamellibranchs (0.1), ostracods (0.1), others (0.1).

Table 4.5.5 (Contd.2)

Station (Date)	Biomass (ml/100 m^3)	Population (nox10^3/100 m^3)	Total groups (no)	Major group (%)
4 (21.12.08)	1.6-14.1 (7.9)	4.3-39.3 (21.8)	16-17 (17)	Copepods (65.5), decapod larvae (24.1), appendicularians (3.3) foraminiferans (3.1) chaetognaths (2.3), gastropods (0.5) ostracods (0.5), lucifer sp. (0.2), fish larvae (0.1), heteropods (0.1), polychaetes (0.1), fish larvae (0.1), others (0.1).
5 (04.12.08)	1.6-2.1 (1.9)	11.4-12.7 (12.1)	14-17 (16)	Decapod larvae (68.3) copepods (27.8) chaetognaths (1.2) gastropods (0.9), foraminiferans (0.7) polychaetes (0.3), ostracods (0.3), siphonophores (0.2) stomatopods (0.1), fish larvae (0.1),
6 (04.12.08)	0.4-3.7 (2.1)	3.6-6.2 (4.9)	9-11 (10)	Copepods (47.5), decapod larvae (46.6), chaetognaths (2.7), foraminiferans (1.5), stomatopods (0.7), fish larvae (0.5), ostracods (0.1) gastropods (0.1), siphonophores (0.1), polychaetes (0.1) others (0.1).

Table 4.5.6: Distribution of zooplankton off Vandh during December 2008

Faunal group	Station					
	1	2	3	4	5	6
Foraminiferans	+	+	+	+	+	+
Siphonophores	+	+	+	+	+	+
Medusae	+	+	+	+	-	-
Ctenophores	-	+	-	+	-	-
Chaetognaths	+	+	+	+	+	+
Polychaetes	+	+	+	+	+	+
Ostracods	+	+	+	+	+	+
Copepods	+	+	+	+	+	+
Cumaceans	+	+	-	-	-	-
Amphipods	+	+	-	+	+	-
Mysids	-	+	-	-	+	-
Lucifer sp.	+	+	+	+	+	+
Decapod larvae	+	+	+	+	+	+
Stomatopods	+	+	+	+	+	+
Heteropods	-	+	-	+	+	-
Cephalopods	-	-	-	-	+	-
Gastropods	+	+	+	+	+	+
Lamellibranchs	+	+	+	+	+	-
Appendicularians	+	+	+	+	+	-
Fish eggs	+	+	+	+	+	+
Fish larvae	+	+	+	+	+	+
Isopods	+	-	-	+	-	-
Marine insects	-	+	-	-	-	-

(+: Present; - : Absent)

Table 4.5.7: Total counts and average (parenthesis) of decapod larvae, fish eggs and fish larvae off Vandh during December 2008

Stations	Decapod larvae	Fish eggs	Fish larvae
	Counts (no/100m^3)	Counts (no/100m^3)	Counts (no/100m^3)
1	6486-9462 (7974)	2-31 (17)	5-12 (9)
2	670-7411 (2606)	0-239 (68)	0-78 (13)
3	6486-9462 (7974)	2-3 (3)	1-3 (2)
4	408-10101 (5255)	1-25 (13)	7-56 (32)
5	7149-9356 (8253)	4-6 (5)	6-15 (11)
6	1270-3316 (2293)	0-1 (1)	7-48 (28)
Over all Average	408-10101 (5726)	0-239 (18)	0-78 (16)

Table 4.5.8: Range and average (parenthesis) of intertidal macrobenthos at different water level off Vandh during December 2008.

Transect	Biomass (g/m^2; wet wt.)	Population (no/m^2)	Faunal groups (no)	Major group
I HW	5.19-15.1 (11.3)	3124-12848 (6666)	4-7 (6)	Polychaetes, amphipods.
MW	0.69-15.27 (6.9)	792-10332 (3551)	4-7 (5)	Gastropods, polychaetes, amphipods.
LW	0.27-.093 (0.6)	440-660 (583)	3-4 (4)	Polychaetes, amphipods.
II HW	6.82-23.75 (17.5)	1408-3080 (2090)	5-6 (5)	Amphipods, polychaetes, tanaids.
MW	4.87-10.77 (7.1)	2332-4312 (3113)	5-6 (6)	Polychaetes, amphipods, cumaceans.
LW	1.62-4.16 (2.8)	2552-9240 (5018)	5-6 (6)	Amphipods, cumaceans, polychaetes.
Over all Average	0.27-23.75 (7.7)	440-12848 (3504)	3-8 (5)	Amphipods, polychaetes, gastropods, cumaceans.

Table 4.5.9: Composition (%) of intertidal macrobenthic fauna in coastal water off Vandh during December 2008

Faunal groups	Transect I			Transect II			Av
	HW	MW	LW	HW	MW	LW	
Phylum Cnidaria							
Hydrozoans					0.4	0.4	0.14
Anthozoans	0.2						0.1
Phylum Mollusca							
Gastropods		69.1	1.9		1.4	0.7	12.1
Pelecypods	1.9	0.6		0.5	2.1	0.2	1.1
Phylum Annelida							
Polychaetes	48	14.2	64.2	26.8	42.4	12.3	31.3
Phylum Arthropoda							
Tanaids	6.4	2.5	7.5	14.2	2.5	1.8	4.9
Cumaceans	0.2	0.9	3.8	1.1	20.8	31.4	10.9
Amphipods	41.9	11.2	20.8	43.2	27.9	51.3	36.4
Isopods	0.3	0.6		3.2		0.5	0.6
Anomurans						0.2	0.04
Mysids					0.7		0.1
Pycnogonids						0.5	0.1
Brachyurans	0.9	0.9	1.9	11.1	1.8	0..5	1.9
Ostracods						0.2	0.04
Penaeids						0.2	0.04

Table 4.5.10: Range and average (parenthesis) of subtidal macrobenthic fauna off Vandh during December 2008

Subtidal	Biomass (g/m^2; wet wt.)	Population (no/m^2)	Faunal groups (no)	Major group
1	0.1-<0.01 (0.03)	25-75 (25)	1*	Polychaetes
2	0.03-0.11 (0.1)	25-400 (194)	1-3 (2)	Polychaetes, amphipods.
3	0.83-4.23 (1.9)	425-1100 (725)	7-9 (8)	Brachyurans, amphipods, pelecypods, polychaetes.
4	*			
5	*			
6	*			
Over all Average	0.1-4.23 (0.7)	25-1100 (315)	1-9 (4)	Polychaetes, brachyurans, amphipods.

Note: - * Indicates rocky bottom.

Table 4.5.11: Composition (%) of subtidal macrobenthos in coastal water off Vandh during December 2008

Faunal Groups	Stations					
	1	2	3	4	5	6
Phylum Cnidaria						
Hydrozoans			1.8	*	*	*
Phylum Mollusca						
Gastropods			4.3			
Pelecypods			11.2			
Phylum Annelida						
Polychaetes	76	77.3	10.3			
Phylum Arthropoda						
Ostracods		9.8	3.4			
Brachyurans			31			
Pycnogonids			5.9			
Tanaidaceans			8.7			
Amphipods	24	12.9	21.5			
Cumaceans			1.8			

Note: - * Indicates rocky bottom.

Table 4.5.12: Marine fish landings (t x10^3/y) of Gujarat State and districts adjoining the Gulf

Year	State	Jamnagar	Rajkot	Kachchh	Total contribution By districts (%)
1965-66	109.9	4.2	--	2.4	6.0
1966-67	115.2	2.8	--	3.0	5.0
1967-68	124.9	3.8	--	3.3	5.7
1968-69	131.7	2.8	--	2.3	3.8
1969-70	140.0	2.9	--	2.7	4.0
1970-71	151.2	4.7	--	3.9	5.7
1971-72	147.0	5.5	--	4.1	6.5
1972-73	151.2	4.6	--	4.8	6.2
1973-74	177.6	6.8	--	6.9	7.7
1974-75	157.4	3.0	0.3	4.3	4.8
1975-76	208.3	5.1	2.2	3.8	5.3
1976-77	225.4	21.7	1.3	5.4	12.6
1977-78	176.9	14.5	0.4	6.3	12.0
1978-79	230.0	21.8	2.7	6.3	13.4
1979-80	206.7	24.8	0.6	5.7	15.0
1980-81	218.9	32.3	1.7	4.4	17.5
1981-82	220.6	34.2	2.0	6.3	19.3
1982-83	192.7	29.7	0.5	13.8	22.8
1983-84	223.3	27.4	1.3	23.3	17.3
1984-85	290.7	31.5	0.7	34.3	22.9

Table 4.5.12 (contd.2)

Year	State	Jamnagar	Rajkot	Kachchh	Total contribution By districts (%)
1985-86	306.6	25.2	1.7	35.4	20.3
1986-87	315.9	28.0	0.5	31.3	18.9
1987-88	327.6	40.2	0.5	29.7	21.5
1988-89	414.1	44.2	2.8	46.9	22.7
1989-90	432.4	45.4	2.5	49.6	22.5
1990-91	500.5	54.3	1.8	65.4	24.3
1991-92	530.0	63.5	2.7	61.8	24.1
1992-93	609.1	66.2	1.1	63.0	21.4
1993-94	619.8	58.9	1.5	63.2	19.9
1994-95	645.3	58.9	1.5	76.8	21.0
1995-96	598.4	68.1	1.0	72.6	23.7
1996-97	660.1	76.2	0.9	76.7	23.3
1997-98	702.4	56.0	0.8	71.8	18.3
1998-99	551.7	28.6	0.2	69.7	17.9
1999-00	671.0	71.7	0.8	75.0	22.0
2000-01	620.5	72.6	1.7	64.7	22.4
2001-02	650.8	83.4	2.1	80.0	25.4
2002-03	743.4	102.8	1.5	80.7	24.9
2003-04	609.1	37.9	1.7	72.0	18.3
2004-05	585.0	45.9	1.9	64.7	19.2
2005-06	663.9	66.5	1.5	62.4	19.6

Source: Department of Fisheries, Government of Gujarat

Table 4.5.13: Composition of marine fish landings (t/y) of Kachchh district during 1997-98, 1998-99, 2000-01, 2002-03, 2004-05 and 2005-06

Name of fish	1997-98	1998-99	2000-01	2002-03	2003-04	2004-05	2005-06
White pomfret	1110	801	924	1022.4	1103.9	725.3	1673
Black pomfret	35	33	140	45.5	74.9	77.3	49
Bombay duck	15011	12354	13547	14152.0	12264.2	10021.4	8436
Thread fin	737	944	351	1331.9	1048.5	380.5	434
Jew fish	1124	1372	520	1780.4	1496.0	802.1	742
Hilsa	225	208	142	221.9	181.2	36.9	194
Other clupeids	2116	1762	1947	2242.2	2380.0	2240.8	2406
Coilia	5603	6028	3829	5801.2	6088.2	6117.8	3980
Shark	3415	2686	2118	3817.7	2986.1	1629.6	1837
Mullet	2132	1864	878	786.9	1361.9	1348.7	2557
Cat fish	1367	1782	1030	2428.6	1896.2	1476.3	1834
Eel	79	134	153	236.5	146.0	299.0	156
Leather jacket	113	88	144	161.8	93.6	158.9	479
Seer fish	238	406	192	345.5	421.3	316.1	354
Indian salmon	201	329	158	223.8	149.1	241.4	257
Ribbon fish	3294	1950	2556	3076.9	2964.4	2601.2	2392
Silver bar	518	453	528	796.9	1324.3	1517.6	1253
Perches	254	215	298	728	409.3	408.9	244
Small sciaenids	23848	26742	22685	4432..0	4435.6	4545.7	4253
Shrimp	4810	5512	5008	6659.1	6351.2	5364.3	6281
Prawns (medium)	1732	1302	1260	1226.3	1631.9	780.1	1025
Prawns (Jumbo)	166	191	372	239.7	292.8	215.8	212
Lobster	33	43	88	120.1	49.0	23.1	89
Crabs	140	42	229	40.6	37.0	44.2	121
Mud Skipper	1	0	20	0.4	-	-	11
Squid	22	14	38	22.1	19.0	18.1	40
Others	3463	2429	5541	28778.7	22789.9	23162.3	21045
Total	**71787**	**69685**	**64696**	**80714.3**	**71995**	**64680.2**	**62394**

Source: Department of Fisheries, Government of Gujarat

Table 4.5.14: Month-wise composition of marine fish landings (t) of Kachchh district during 2002-03

Name of fish	April 02	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan 03	Feb	Mar	Total
White pomfret	74.5	74.5	-	-	0.8	192.3	79.0	104.6	136.8	99.2	93.9	96.6	952.0
Black pomfret	5.3	-	-	-	-	4.0	3.6	7.7	5.5	15.7	1.8	1.8	45.5
Bombay duck	844.5	1009.0	-	-	-	93.2	1429.6	3101.3	2527.7	2606.5	2047.9	1146.9	14806.5
Thread fin	237.2	47.4	-	-	-	22.1	29.0	66.4	109.2	160.5	226.6	404.8	1301.2
Jew fish	245.8	44.2	-	-	1.7	48.6	103.3	108.5	150.4	302.8	321.7	417.7	1744.6
Hilsa	11.2	-	-	-	-	8.6	18.1	26.1	32.9	30.6	50.1	44.2	221.9
Other clupeids	140.3	67.7	0.7	-	17.2	87.6	154.7	450.4	313.4	182.5	182.8	677.5	2274.9
Coilia	260.1	424.5	-	-	2.2	60.7	412.3	1139.0	1004.0	1165.1	1095.8	514.6	6078.3
Shark	294.2	42.4	0.2	-	20.5	133.6	261.3	590.9	689.7	889.8	450.9	425.1	3798.5
Mullet	61.5	47.1	6.3	-	74.8	125.5	125.2	95.6	54.7	92.2	40.6	55.0	778.4
Cat fish	257.0	95.5	1.7	-	24.5	93.8	175.4	253.5	224.7	387.2	273.4	701.8	2445.3
Eel	32.1	-	-	-	-	0.6	13.5	43.8	50.0	27.4	44.6	24.6	236.5
Leather jacket	5.3	-	-	-	-	9.5	19.8	20.9	26.4	43.2	16.7	20.0	161.8
Seer fish	15.6	-	-	-	-	23.6	54.4	61.2	64.5	51.1	46.6	28.5	345.5
Indian salmon	8.9	4.7	-	-	-	17.1	30.4	28.3	32.1	34.9	39.8	27.6	223.8

Table 4.5.14 (Contd 2)

Name of fish	April 02	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan 03	Feb	Mar	Total
Ribbon fish	203.7	-	-	-	2.1	100.6	169.1	590.7	618.7	641.0	510.1	241.4	3077.3
Silver bar	143.0	90.4	0.1	-	0.2	18.1	83.7	85.6	71.0	85.3	96.9	185.2	859.5
Perches	24.7	14.0	-	-	0.5	32.8	263.0	105.9	112.5	58.1	71.0	45.5	728.0
Small scienides	308.8	32.7	-	-	5.8	496.1	399.7	691.8	794.8	541.3	706.3	447.1	4424.5
Shrimps	454.5	206.7	1.0	-	16.7	540.5	532.8	1132.7	1161.5	1051.4	1010.1	689.7	6797.5
Prawns (medium)	144.6	48.9	1.6	-	1.7	158.4	67.2	190.6	230.3	105.3	181.2	114.2	1243.9
Prawns (jumbo)	11.1	-	-	-	0.2	29.8	12.0	36.9	34.6	63.7	30.3	21.3	239.7
Lobster	2.0	-	-	-	-	7.4	22.5	25.6	24.0	16.7	12.1	9.7	120.1
Crabs	14.8	0.2	-	-	-	2.1	3.9	5.1	5.1	3.4	3.5	2.5	40.6
Levta	0.4	-	-	-	-	-	-	-	-	-	-	-	0.4
Squid fish	1.2	-	-	-	-	1.4	2.3	3.7	4.3	4.2	3.2	1.7	22.1
Miscellaneous	2047.9	83.3	2.9	-	23.3	1790.3	2560.4	4713.3	5359.9	4619.5	4622.0	2988.4	28811.2
Total	**5849.9**	**2333.0**	**14.4**	**-**	**192.2**	**4098.1**	**6981.2**	**13679.8**	**13838.5**	**13278.7**	**12980.1**	**933.4**	**81779.4**

Source: Department of Fisheries, Government of Gujarat

Table 4.5.15: Marine fish landings (t x 10^3/y) of Kachchh district and its comparison with the landing at Mundra.

Year	Kachchh District	Mundra	Percentage of district landings
1991-92	61.8	2.4	3.9
1992-93	63.0	0.4	0.6
1993-94	63.2	0.8	1.2
1994-95	76.8	0.6	0.8
1995-96	72.7	2.7	3.8
1996-97	76.7	-	-
1997-98	71.8	1.3	1.8
1998-99	69.7	1.7	2.4
1999-00	75.0	-	-
2000-01	64.7	0.4	0.6
2001-02	80.2	1.4	1.7
2002-03	81.8	1.6	2.0
2003-04	72.1	1.6	2.2
2004-05	64.7	1.6	2.5
2005-06	62.4	1.0	1.6

Source: Department of fisheries, Government of Gujarat

Table 4.5.16: Composition of marine fish landings (t/y) at Mundra during 1994-2006

Name of fish	94-95	95-96	97-98	2000-01	01-02	02-03	05-06
White pomfret	19.2	68.4	18.0	10.5	11.5	15.8	8.3
Black pomfret	3.3	13.0	-	-	-	2.5	-
Bombay duck	205.1	1040.0	540.5	122.6	602.7	737.5	344.1
Jew fish	14.8	43.3	6.2	-	13.2	36.9	-
Other clupeids	--	--	9.3	19.3	9.1	18.1	59.9
Coilia	171.3	549.4	323.3	52.7	219.0	292.5	235.8
Shark	12.7	25.4	6.3	8.5	32.9	42.2	0.2
Mullet	17.2	--	24.9	17.5	5.0	19.0	28.9
Cat fish	9.0	9.6	11.9	23.7	68.6	80.7	22.8
Eel	--	--	--	-	2.3	-	-
Leather jacket	--	--	2.2	-	1.8	2.5	-
Seer fish	7.1	14.1	12.7	4.0	12.1	21.1	4.3
Indian salmon	-	-	-	-	-	-	5.6
Ribbon fish	2.1	--	3.3	10.6	6.5	24.3	28.8
Silver bar	2.6	6.9	5.6	2.3	19.4	47.6	15.0
Small sciaenids	7.3	5.5	13.2	3.8	7.9	2.4	60.3
Shrimps	-	-	-	-	-	-	73.1
Prawns (medium)	13.9	6.6	10.0	24.2	208.8	132.2	22.6
Lobster	--	0.5	1.1	1.9	2.9	-	5.8
Crabs	8.5	1.0	0.9	3.1	-	-	2.2
Levta	--	1.8	--	-	-	-	-
Others	73.8	212.5	227.4	47.3	158.2	170.0	113.0
Total	623.5	2730.4	1263.9	351.7	1381.6	1645.3	1030.7

Source: Department of Fisheries, Government of Gujarat

Table 4.5.17: Month-wise marine fish landings (t) around Mundra during 2005-06

Landing centre	April 05	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan 06	Feb	Mar	Total
Navinal	39.0	74.4	9.0	6.9	18.1	20.7	8.6	267.1	226.5	178.6	86.4	134.8	1070.1
Jarpara	18.6	2.3	12.4	6.6	18.3	33.1	0	15.3	26.2	70.8	90.9	38.2	3327.0
Mundra	205.3	151.9	16.9	17.6	20.2	30.1	17.5	45.9	46.8	180.7	138.2	159.5	1031.0
Bhadreshwar	145.7	93.4	9.4	9.6	19.2	94.7	344.8	350.7	332.0	222.5	284.1	253.4	2159.5

Source: Department of Fisheries, Government of Gujarat

Table 4.5.18: Composition of marine fish landings (t) around Mundra during 2005-06

Name of fish	Mundra	Jarpara	Navinal	Bhadreshwar
White pomfret	8.3	0.7	14.4	49.5
Black pomfret	-	-	-	-
Bombay duck	344.1	30.7	379.1	707.9
Jew fish	-	-	17.0	7.5
Hilsa	-	7.1	3.0	1.3
Other clupeids	59.9	46.8	35.2	156.8
Coilia	235.8	3.8	197.1	288.6
Shark	0.2	12.6	34.6	22.8
Mullet	28.9	19.3	31.9	46.9
Cat fish	22.8	23.9	46.8	70.0
Eel	-	-	5.3	-
Seer fish	4.3	4.7	12.5	3.1
Indian salmon	5.6	10.9	17.4	0.7
Leather jacket	-	12.6	12.0	-
Ribbon fish	28.8	7.6	22.8	112.9
Silver bar	15.0	3.2	12.8	50.3
Small sciaenids	60.3	23.8	71.6	159.2
Shrimps	73.1	58.0	60.8	180.5
Prawns (medium)	22.6	6.3	13.0	38.0
Lobster	5.8	2.7	5.7	-
Crabs	2.2	-	3.9	4.8
Miscellaneous	113.0	57.9	73.5	258.7
Total	1030.7	332.6	1070.5	2159.5

Source : Department of Fisheries, Government of Gujarat

Table 4.5.19: District-wise fishing villages, fishermen, boats and fishing gears (2003) of Kachchh district

Parameter	
Length of coast line (km)	406
Percentage of the coast line of Kachchh district	25.4
Fishing villages/cities (no)	73
Fishermen families (no)	3650
Total fishermen population (no)	18664
Active fishermen (no)	10615
Fishing boats (mechanised) (no)	1219
Fishing boats (non-mechanised) (no)	291
Total fishing gears (nets) (no)	25917
Trawlers (no)	11
Gill netters (no)	188
Others (no)	1019

Source: Department of Fisheries, Government of Gujarat.

Table 4.5.20: Village-wise fishermen, boats and fishing gears around Mundra

Village	Total fishermen				Fishing boats		
	Families	Gents	Ladies	Total	Mechanised	Non-mechanised	Total
Navinal	22	62	53	115	9	-	9
Jarpara	101	307	278	585	20	-	20
Dharab	16	54	47	101	-	-	-
Mundra	71	180	146	326	80	-	80
Chenkhedia	74	248	230	478	24	-	24
Luni	227	619	660	1279	65	1	66
Bhadreshwar	194	541	554	1095	95	-	95
Total	**705**	**2011**	**1968**	**3979**	**293**	**1**	**294**

Source: Department of Fisheries, Government of Gujarat.

Table 4.5.21: Species compositions of fish catch off Tunda-Vandh during April/May 2007

Station/ (Date)	Time (h)/ (Tide)	Catch Kg/hr	Total Species (no)	Common Species
Kotdi Creek (30.4.07)	1030 (Fl)	5.3	F-8 P-3 O-2	Fishes: *Harpadon nehereus, Sillago sihama, Johnius glaucus, Arius caelatus, Ilisha* sp.*, Coilia dussumieri, Otolithes* sp.*, Thryssa* sp. Prawns: *Exhippolysmata ensirostris, Metapenaeus* sp.*, Parapenaeopsis stylifera* Others: *Neptunus pelagicus, Matuta planipes*
Kotdi Creek (2.5.07)	1300 (Fl)	5.0	F-9 P-2 O-2	Fishes: *Sillago sihama, Johnius glaucus, Harpadon nehereus, Thryssa* sp.*, Arius caelatus, Coilia dussumieri, Valamugil seheli, Ambassidae, Arius* sp. Prawns: *Metapenaeus sp., Exhippolysmata ensirostris* Others: *Neptunus pelagicus, Squilla*
Kotdi Off (29.4.07)	1200 (Fl)	12.0	F-13 P-4 O-3	Fishes: *Harpadon nehereus, Johnius glaucus, Coilia dussumieri, Arius jella, Polynemus tetradactylus, Scomberomorus guttatus, Otolithes* sp.*, Ilisha* sp.*, Pampus argentius, Scoliodon laticaudus, Thryssa hamiltoni, Lepturocanthus savala, Terapon theraps* Prawns: *Exhippolysmata ensirostris, Metapenaeus* sp.*, Metapenaeus dobsoni, Exopalaemon stylifera* Others: *Neptunus pelagicus, Loligo, Squilla*

Table 4.5.21 (Contd 2)

Station/ (Date)	Time (h)/ (Tide)	Catch Kg/hr	Total Species (no)	Common Species
Kotdi Off (30.4.07)	1300 (Fl)	14.5	F-14 P-4 O-4	Fishes: *Harpadon nehereus, Thryssa setiostris, Thryssa vitrirostris, Pampus argentius, Synaptura commersoniana, Caranx para, Coilia dussumieri, Arius caelatus, Scoliodon laticaudus, Ilisha* sp.*, Otolithus brunneus, Johnius* sp.*, Otolithus* sp.*, Lepturocanthus savala* Prawns: *Penaeus indicus, Parapenaeopsis sculptilis, Exhippolysmata ensirostris, Metapenaeus* sp. Others: *Charybdis cruciata*, *Neptunus pelagicus, Loligo, Squilla*
Kotdi Off (2.5.07)	1600 (Eb)	9.8	F-11 P-4 O-4	Fishes: *Harpadon nehereus, Pampus argentius, Ilisha megaloptera, Thryssa vitrirostris, Caranx para, Coilia dussumieri, Johnius glaucus, Arius caelatus, Arius* sp.*, Otolithes* sp. *, Scomberomorus guttatus* Prawns: *Exhippolysmata ensirostris, Metapenaeus brevicornis, Penaeus merguiensis, Metapenaeus* sp. Others: *Charybdis cruciata*, *Neptunus pelagicus, Loligo, Squilla*

Table 4.5.22: Species compositions of fish catch off Tunda-Vandh during October/November 2007

Station/ (Date)	Time (h)/ (Tide)	Catch Kg/hr	Total Species (no)	Common Species
Kotdi Creek (9.10.07)	1000 (Fl)	5.5	F-10 P-3 O-2	Fishes: *Johnius glaucus, Coilia dussumieri, Ilisha megaloptera, Terapon jarbua, Trichurus lepturus, Polynemus tetradactylus, Liza parsia, Valamugil seheli, Sillago sihama, Arius* sp. Prawns: *Penaeus indicus, Parapenaeopsis sculptilis, metapenaeopsis* sp. Others: *Charybdis annulata, Squilla*
Kotdi Creek (14.10.07)	1500 (Fl)	7.0	F-11 P-3 O-4	Fishes: *Trichurus lepturus, Coilia dussumieri, Harpadon nehereus, Opisthopterus tardoore, Pseudomecanthus strigelliter, Arius caelatus, Johnius glaucus, Terapon theraps,, Sillago sihama, Arius* sp. Prawns: *Parapenaeopsis sculptilis, Exhippolysmata ensirostris, Metapenaeus* sp. Others: *Matuta planipes , Charybdis cruciata*, *Loligo, Squilla*
Kotdi Creek (14.10.07)	0900 (Eb)	3.0	F-7 P-2 O-2	Fishes: *Harpadon nehereus, Johnius glaucus, , Sillago sihama, Trichurus* sp.*, Arius caelatus, Mugil* sp.*, Coilia dussumieri* Prawns: *Metapenaeus brevicornis, Metapenaeus* sp. Others: *Charybdis annulata,Squilla*

Table 4.5.22 (Contd 2)

Station/ (Date)	Time (h)/ (Tide)	Catch Kg/hr	Total Species (no)	Common Species	
Kotdi off (16.10.07)	1500 (Fl)	15.5	F-13 P-3 O-3	Fishes:	*Trichurus lepturus, Coilia dussumieri, Harpadon nehereus, Johnius glacus, Arius caelatus, Sillago sihama, Lepturocanthus savala, Terapon theraps, Pampus argentius, Pampus chinensis, Otolithes* sp*., Ilisha megaloptera, Thryssa* sp*.* *Exopalaemon ensirostris, Metapenaeus* sp*., Penaeus* sp*.* *Charybdis annulata, Neptunus pelagicus, Squilla*
				Prawns:	
				Others:	
Kotdi Off (18.10.07)	1600 (Fl)	18.0	F-14 P-3 O-4	Fishes:	*Johnius glacus, Trichurus lepturus, Coilia dussumieri, Harpadon nehereus, Pampus argentius, Pampus chinensis, Ilisha megaloptera, Thryssa hamiltoni, Scoliodon laticadus, Otolithus brunneus, Thryssa* sp*., Sillago sihama, Arius* sp*., Otolithus* sp*.* *Penaeus indicus, Parapenaeopsis sculptilis, Metapenaeus* sp*.* *Neptunus pelagicus, Charybdis annulata, Squilla, Loligo*
				Prawns:	
				Others:	
Kotdi Off (18.10.07)	1000 (Eb)	13.0	F-15 P-4 O-4	Fishes:	*Coilia dussumieri, Trichurus lepturus, Harpadon nehereus, Pampus argentius, Pseudomecanthus strigelliter, Opisthopterus tardoori, Johnieopsis vogleri, Drepane longimana, Oligoplites* sp*., Terapon puta, Ilisha megaloptera, Arius caelatus, Johnius glacus, Scoliodon laticaudus, Otolithes* sp*.* *Solenocera crassicornis, Exhippolysmata ensirostris, Parapenaeopsis stylifera, Penaeus* sp*.* *Matuta planipes, Charybdis cruciata, Squilla, Loligo*
				Prawns:	
				Others:	

Table 4.5.23: Check list of birds recorded in the study area (Mundra)

No	Scientific name	Common English name	T/W	Abundance status	Migratory status
	Family & species				
	Phasianidae				
1	*Francolinus pondicerianus*	Grey francolin	T	C	R
2	*Pavo cristatus*	Indian peafowl	T	C	R
	Picidae				
3	*Dendrocopos mahrattensis*	Yellow-crowned woodpecker	T	VR	R
	Upupidae				
4	*Upupa epops*	Common hoopoe	T	R	R
	Coraciidae				
5	*Coracias garrulus*	European roller	T	R	M
6	*Coracias benghalensis*	Indian roller	T	C	R
	Alcedinidae				
7	*Alcedo hercules*	Common kingfisher	W	R	R
8	*Halcyon amayroptera*	White throated kingfisher	W	R	R
	Meropidae				
9	*Merops orientalis*	Green bee-eater	T	A	R
10	*Merops persicus*	Blue-cheeked bee-eater	T	R	RM
	Cuculidae				
11	*Eudynamys scolopacea*	Indian Koel	T	C	R
	Centropodidae				
12	*Centropus sinensis*	Greater coucal	T	R	R
	Psittacidae				
13	*Psittacula krameri*	Rose-ringed parakeet	T	C	R
	Apodidae				
14	*Apus affinis*	House swift	T	R	R
	Strigidae				
15	*Bubo nipalensis*	Spot-bellied eagle-owl	T	R	R
16	*Athene brama*	Spotted owlet	T	C	R

Table 4.5.23 (Contd 2)

No	Scientific name	Common English name	T/W	Abundance status	Migratory status
	Caprimulgidae				
17	*Caprimulgus indicus*	Sykes's nightjar	T	R	RM
18	*Caprimulgus asiaticus*	Indian nighjar	T	R	R
	Columbidae				
19	*Columba livea*	Blue rock pigeon	T	A	R
20	*Streptopelia senegalensis*	Laughing dove	T	A	R
21	*Streptopelia tranquebarica*	Red collared-dove	T	R	R
22	*Streptopelia decaocto*	Eurasian collared-dove	T	C	R
	Otididae				
23	*Chlamydotis macqueeni*	Houabara bustrad	T	VR	M
	Gruidae				
24	*Grus leucogeranus*	Common crane	W/T	C	M
	Pteroclidae				
25	*Pterocles alchata*	Chestnut-bellied sandgrouse	T	C	R
	Scolopaciadae				
26	*Limosa limosa*	Black-tailed godwit	W	R	M
27	*Limosa lapponica*	Bar-tailed godwit	W	C	M
28	*Numenius phaeopus*	Whimbrel	W	A	M
29	*Numenius arquata*	Eurasian curlew	W	A	M
30	*Tringa erythropus*	Spotted redshank	W	R	M
31	*Tringa totanus*	Common redshank	W	A	RM
32	*Tringa stagnatilis*	Marsh sandpiper	W	C	M
33	*Tringa nebularia*	Common greenshank	W	C	R
34	*Tringa glareola*	Wood sandpiper	W	R	M
35	*Xenus cinereus*	Terek sandpiper	W	C	W
36	*Actitis hypoleucos*	Common sandpiper	W	A	RM

Table 4.5.23 (Contd 3)

No	Scientific name	Common English name	T/W	Abundance status	Migratory status
37	*Calidris tenuirostris*	Sanderling	W	C	M
38	*Calidris minuta*	Little stint	W	R	M
39	*Calidris temminckii*	Temminck's stint	W	R	M
40	*Calidris alpina*	Dunlin	W	C	M
41	*Philomachus pugnax*	Ruff	W	R	M
42	*Phalaropus lobatus*	Red-necked phalarope	W	R	M
43	*Vanellus malarbaricus*	Yellow-wattled lapwing	T	R	R
44	*Vanellus indicus*	Red-wattled lapwing	W/T	A	R
	Charadriidae				
45	*Haematopus ostralegus*	Eurasian oystercatcher	W	R	M
46	*Himantopus himantopus*	Blackwinged stilt	W	R	R
47	*Recurvirostra avosetta*	Pied avocet	W	R	RM
48	*Pluvialis apricaria*	Eurasian golden plover	W	R	M
49	*Pluvialis squatarola*	Grey plover	W	R	M
50	*Charadrius hiaticula*	Common ringed plover	W	C	RM
51	*Charadrius alexandrinus*	Kentish plover	W	C	RM
52	*Charadrius leschenaultii*	Greater sand plover	W	C	M
	Glareolidae				
53	*Dromas ardeola*	Crab-plover	W	R	M
	Laridae				
54	*Rynchops albicollis*	Indian skimmer	W	VR	R
55	*Larus argentatus*	Herring gull	W	VR	R
56	*Larus brunnicephalus*	Brown-headed gull	W	R	RM
57	*Larus genei*	Slender Billed tern	W	A	RM
58	*Gelochelidon nilotica*	Gull-billed tern	W	A	RM
59	*Sterna caspia*	Capian tern	W	R	RM

Table 4.5.23 (Contd 4)

No	Scientific name	Common English name	T/W	Abundance status	Migratory status
60	*Sterna aurantia*	River tern	W	C	R
61	*Sterna bergii*	Great crested tern	W	R	R
62	*Sterna albifrons*	Little tern	W	R	R
63	*Chlidonias hybridus*	Whiskered tern	W	C	RM
	Acipitridae				
64	*Pandion haliaetus*	Osprey	W/T	VR	RM
65	*Pernis ptilorhyncus*	Oriental honey buzzard	T	VR	RM
66	*Elanus caeruleus*	Black-shouldered kite	T	VR	R
67	*Haliastur indus*	Brahminy kite	T	VR	R
68	*Circaehr gallicus*	Shorat-toed snake-eagle			
69	*Circus aeruginosus*	Eurasian marsh harrier	T/W	VR	M
70	*Circus macrourus*	Pallid harrier	T	VR	M
71	*Accipiter nisus*	Eurasian sparrowhawk	T	R	M
72	*Aquila rapax*	Tawny eagle	T	VR	R
73	*Hieraaetus fasciatus*	Bonelli’s eagle	T	VR	R
	Falconidae				
74	*Falco tinnunculus*	Common kestrel	T	VR	RM
75	*Falco chicquera*	Red-headed merlin	T	VR	R
76	*Falco subbuteo*	Northern hobby	T	VR	RM
77	*Falco jugger*	Lagger falcon	T	VR	RM
	Ardeidae				
78	*Egretta garzetta*	Little egret	W	C	R
79	*Egretta gularis*	Western reef heron	W		RM
80	*Ardea cinerea*	Grey heron	W		RM
81	*Casmerodius albus*	Great egret	W		RM
82	*Mesophoyx intermedia*	Intermediate egret	W		RM
83	*Bubulcus ibis*	Cattle egret	T		R
84	*Ardeola grayii*	Indian pond-heron	W		R

Table 4.5.23 (Contd 5)

No	Scientific name	Common English name	T/W	Abundance status	Migratory status
85	*Phoenicopterus ruber*	Greater flamingo	W		R
86	*Phoenicopterus minor*	Lesser flamingo	W		R
	Threskiornithidae				
87	*Threskiornis melanocephalus*	Asian white ibis	W		R
88	*Pseudibis papillosa*	Black ibis	W/T		R
89	*Platalea leucorodia*	Eurasian spoonbill	W		RM
	Pelecanidae				
90	*Pelecanus crispus*	Dalmatian pelican	W		M
	Ciconiidae				
91	*Mycteria leucocephala*	Painted stork	W		RM
	Laniidae				
92	*Lanius collurio*	Rufous-tailed shrike	T		M
93	*Lanius vittatus*	By-backed shrike	T		R
94	*Lanius schach*	Long-tailed shrike	T		R
95	*Lanius excubitor*	Great grey shrike	T		RM
	Corvidae				
96	*Corvus slendens*	House crow	T		R
97	*Corvus macrorhynchos*	Jungle crow	T		R
98	*Pericrocotus cinnamomeus*	Small minivet	T		R
99	*Dicrurus macrocercus*	Black drongo	T		R
100	*Aegithina tiphia*	Marshall’s lora	T		R
101	*Tephrodornis pondicerianus*	Lesser woodshrike	T		R
	Muscicapidae				
102	*Ficedula zanthopygia*	Red-throated flycatcher	T		M
103	*Saxicoloides fulicate*	Indian robin	T		R
104	*Phoenicurus ochruros*	Black redstart	T		M
105	*Oenanthe pleschanka*	Pied wheatear	T		M

Table 4.5.23 (Contd 6)

No	Scientific name	Common English name	T/W	Abundance status	Migratory status
106	*Oenanthe deserti*	Desert wheather	T		M
107	*Oenanthe isabellina*	Isabelline wheather	T		M
	Sturnidae				
108	*Strunus pagodarum*	Brahminy starling	T		R
109	*Strunus roseus*	Rosy starling	T		M
110	*Acridotheres tristis*	Common myna	T		R
111	*Acridotheres ginginianus*	Bank myna	T		R
	Hirundinidae				
112	*Hirundo rustica*	Barn swallow	T	R	RM
113	*Hirundo smithii*	Wire-tailed swallow	T	R	R
114	*Hirundo daurica*	Red-rumped swallow	T	C	R
	Pycnonotidae				
115	*Pycnonotus leucotis*	White-eared bulbul	T	A	R
116	*Pycnonotus cafer*	Red-ventled bulbul	T	C	R
	Cisticolidae				
117	*Prinia buchanani*	Rufous-fronted prinia	T	C	R
118	*Prinia sylvatica*	Jungle prinia	T	R	R
	Zosterops				
119	**Zosterops *palpebrosus***	Oriental white-eye	T	C	R
	Sylviidae				
120	*Acrocephalus dumetorum*	Blyth's reed warbler	T	C	M
121	*Acrocephalus arundinaceus*	Great reed warbler	T	C	M
122	*Hippolais caligata*	Booted warbler	T	VR	M
123	*Orthotomus sutorius*	Common tailorbird	T	A	R
124	*Turdoides caudatus*	Common babbler	T	A	R
125	*Sylvia curruca*	Lesser whitethroat	T	A	M

Table 4.5.23 (Contd 7)

No	Scientific name	Common English name	T/W	Abundance status	Migratory status
126	*Sylvia hortensis*	Orphean warbler	T	R	M
	Alaudidae				
127	*Mirafra cantillans*	Singing bush- lark	T	R	R
128	*Eremopterix grisea*	Ashy- crowned sparrow-lark	T	R	R
129	*Calandrella cheleensis*	Asian short- toed lark	T	C	M
130	*Calandrella raytal*	Sand short-toed lark	T	C	M
131	*Galerida cristata*	Crested lark	T	R	R
132	*Alauda gulgula*	Eastern skylark	T	VR	R
	Nectariniidae				
133	*Nectarinia asiatica*	Purple sunbird	T	A	R
	Passeridae				
134	*Passer domesticus*	House sparrow	T	A	R
135	*Passer sp.*	Yellow throated sparrow			
136	*Motacilla cinerea*	Grey wagtail			
137	*Motacilla alba*	White wagtail	W/T	VR	M
138	*Anthus campestris*	Tawny pipit	T	VR	M
139	*Ploceus philippinus*	Baya weaver	T	C	R
140	*Lonchura malabarica*	Plain munia	T	A	R

T/W T: Terrestrial bird, W: Water bird, Abundance status – A: Abundance, C: Common, R: Rare, VR: Very rare.
Migratory status – R: Resident, M: Migrant, RM: Resident with migrant population.