

9 APPENDICES

Appendix 1. Membership of PICES Working Group 12

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Appendix 2. Attendance at PICES WG 12 meetings by Working Group members (* Co-Chairmen) and observers who attended meetings in: 1) Nanaimo 1996, 2) Nemuro 1997, 3) Fairbanks 1998, 4) Qingdao 1999.

Members:

CANADA	Jim Boutillier (1,2,4) Glen Jamieson (1,2,3,4)
CHINA	Zhi-ming Zhuang (4)
JAPAN	Hideo Sekiguchi (2,3,4)
REPUBLIC OF KOREA	Sung Yun Hong (2,3,4) In-Ja Yeon (2,3)
RUSSIAN FEDERATION	Boris G. Ivanov (2,3,4) Vitaly E. Rodin * (2,3,4) Yuliya B. Zaitseva (2)
U.S.A.	David A. Armstrong (1,2,3) Robert S. Otto * (1,2,3,4)

Observers:

Nemuro: M. Kashiwai (PICES Science Board), Y. Nagata (PICES/CCCC Co-Chairmen), J. Kittaka (Science University of Tokyo), F. Abrunhosa (Science University of Tokyo), E.V. Radhakrishnan (Regional center CMFRI, India), S. Ivanov (TINRO, translator) and J. Armstrong (University of Washington).

Fairbanks: Makoto Kashiwai (Chairman, Science Board), Alexander A. Kurmazov (TINRO, Russia), Patricia Livingston (CCCC/IP Co-Chairman), Alan M. Springer (University of Alaska), S. Ivanov (TINRO, translator) and Bradly G. Stevens (NMFS Kodiak Laboratory)

Qingdao: Jingyau Deng (Yellow Seas Fishery Research Institute, YSFRI), Jisheng Chen (YSFRI), Ling Tong (YSFRI), Shengli Cai (YSFRI), and S. Ivanov (TINRO, translator).

In 1996, members were named in May and there was limited time for travel arrangements prior to the October meeting. The 1996 meeting was attended by only four members from the United States and Canada and was primarily organizational. Attendance was 11 of 15 members in 1997 and 8 of 15 members in 1998. Five nations were represented in both years. Attendance was 8 of 15 members in 1999 and this was the first meeting at which all six member-nations were represented. Cumulatively, 17 members were appointed by national bodies and 12 members attended one or more meetings. At 1997, 1998 and 1999 meetings members unanimously expressed their belief that scientists from the Democratic Peoples Republic of Korea (North Korea) should attend future PICES meetings if possible since we were unable to receive information over the full range of several stocks in the Japan/East Sea and the Yellow Sea.

Appendix 3. A taxonomic list of species of crabs, shrimps, and lobsters exploited in the PICES Region (major taxon according to American Fisheries Society Special Publication 17, common names per AFS or UN/FAO, if possible). Question marks (?) indicate either uncertainty as to range, importance or general interest, or the need for further definition. Almost all species below have known commercial, recreational or subsistence fisheries that exploit them. * = important species considered by WG12

Phylum, Subphylum, or Superclass: Crustacea

CRABS *et al.*:

Class: Malacostraca
 Subclass: Eumalacostraca
 Order: Decapoda
 Suborder: Pleocymata
 Infraorder: Brachyura
 Section: Oxyrhyncha
 Superfamily: Majoidea
 Family: Majidae

(Spider crabs)

Tanner crab	<i>Chionoecetes bairdi</i> *
Snow crab	<i>C. opilio</i> *
Angled Tanner crab	<i>C. angulatus</i> *
Grooved Tanner crab	<i>C. tanneri</i> *
Benizuwai Tanner (Red Snow) crab	<i>C. japonicus</i> *
Arctic Lyre crab	<i>Hyas coarctatus</i>
Pacific Lyre crab	<i>H. lyratus</i>
Sheep crab	<i>Loxorhynchus grandis</i>

Section: Cancridea
 Superfamily: Cancroidea
 Family: Atelecyclidae

(Horse crabs)

Hair crab	<i>Erimacrus isenbeckii</i> *
Helmut crab	<i>Telmessus cheiragonus</i>

Family: Cancridae

(Rock crabs)

Dungeness crab	<i>Cancer magister</i> *
Red Rock crab	<i>C. productus</i>
Yellow Rock crab	<i>C. anthonyii</i>

Section: Brachyrhyncha
 Superfamily: Portunoidea
 Family: Portunidae

(Swimming crabs)

Sand crab *Portunus pelagicus*
Gazami crab *P. trituberculatus* *
Mud crab *Scylla serrata*

Infraorder: Anomura
Superfamily: Paguroidea
Family: Lithodidae
(Stone and King crabs)

Red King crab *Paralithodes camtschaticus* *
Blue King crab *P. platypus* *
Hanasaki King crab *P. brevipes* *
Golden King crab *Lithodes aequispinus* *
Scarlet King crab *L. couesi* *
Paralomis spp *Paralomis multispinus*
Paralomis spp *Paralomis verrilli*
Puget Sound King crab *Lopholithodes mandtii*

SHRIMPS

Class: Malacostraca
Subclass: Eumalacostraca
Order: Decapoda

Suborder: Dendrobranchiata
Superfamily: Penaeoidea
(Penaeoid shrimps)
Family: Penaeidae

Kuruma shrimp/prawn *Marsupenaeus japonicus* *
Fleshy prawn *Fenneropenaeus chinensis* (=orientalis)
Shiba shrimp *Metapenaeus joyneri* *
Yoshi shrimp *M. ensis* *
Cocktail shrimp *Trachysalambria curvirostris*

Superfamily: Sergestoidea
Family: Sergestidae
Akiami paste shrimp *Acetes chinensis* *, *A. japonicus* *

Suborder: Pleocyemata
Infraorder: Caridea
Superfamily: Pandaloidea
(Pandalid shrimps)
Family: Pandalidae

Sidestriped shrimp *Pandalopsis dispar* *
Morotoge shrimp *P. japonica* *
Northern shrimp *Pandalus borealis/eos* *
Humpy shrimp *P. goniurus* *
Dock shrimp *P. danae*

Coonstriped shrimp *P. hypsinotus* *
Ocean shrimp *P. jordani* *
Spot shrimp *P. platyceros* *
Hokkai shrimp *P. latirostris* *

Superfamily: Crangonoidea
Family: Crangonidae

Northern sculptured shrimp *Sclerocrangon boreas* *
Uneven sculptured shrimp *S. salebrosa* *
San Francisco Bay shrimp *Crangon franciscorum*
Arctic argid shrimp *Argis dentata*
Kuro shrimp *A. lar*

SPINY LOBSTERS

Class: Malacostraca
Subclass: Eumalacostraca
Order: Decapoda

Suborder: Pleocyemata
Superfamily: Palinuroidea
(Palinurid lobsters)
Family: Palinuridae

California spiny lobster *Panulirus interruptus*
Japanese spiny lobster *P. japonicus* *

MANTIS SHRIMPS

Class: Malacostraca
Subclass: Hoplocarida
Order: Stomatopoda
Suborder: Unipeltata
Superfamily: Squilloidea
Family: Squillidae

Chinese mantis shrimp *Oratosquilla oratoria**

Appendix 4. Important PICES Region crab, shrimp, and lobster stocks classified as to stock size, abundance trends, type and degree of fishery development. Current stock abundance is intraspecific relative to its historical level: small (s), medium (m) and large (l). Long-term trends are periodically fluctuating (P), decreasing (D) and increasing (I). Fishery types are characterized as commercial (C), recreational (R) and subsistence (S). Fishery status is characterized as undeveloped (U), developing (D), fully developed (F) or closed to commercial fishing(*).

	Abundance		Long-term	Type	Status
	Historical	Current	Trend		
Crab et al:					
<i>Tanner crab (C. bairdi)</i>					
SE Alaska	s	s	D	C,R,S	F
Cook Inlet	m	s	D	C,R,S	F
Kodiak	l	s	D	C,R,S	F
S Al. Peninsula	l	s	D	C,R,S	F
E Aleutians	s	s	D	C,R,S	F
W Aleutians	s	s	D	C,S	U
E Bering Sea	l	m	D	C	F
NW Bering Sea	s	s	D	C	F
Koryak Coast	m	?	?	C	F
Olyutorskiy Bay	l	?	?	C	F
W Kamchatka	m/l	?	?	C	F
<i>Angled Tanner crab (C. angulatus)</i>					
Canada	?	?	?	C	U
Gulf of Alaska	?	?	?	C	U
Aleutian Islands	?	?	?	C	U
E Bering Sea	?	?	?	C	U
N Sea of Okhotsk	m	?	?	L	U
<i>Grooved Tanner crab (C. tanneri)</i>					
Calif.-Washington	?	?	?	C	U
Canada	?	?	?	C	U
Gulf of Alaska	?	?	?	C	U
Aleutian Islands	?	?	?	C	U
E Bering Sea	?	?	?	C	U
W Bering Sea	s	?	?	L	U
<i>Snow crab (C. opilio)</i>					
E Bering Sea	l	l	P	C	F
W Bering Sea	l/m	l/m	?	C	F
Koryak Coast	m	?	?	C	F
Olyutorskiy Bay	s	?	?	C	F
E Kamchatka	s	?	?	C	F?
W Kamchatka	m	?	?	C	D
N Sea of Okhotsk	l	m	P	C	F
E Sakhalin Is.	l	m/l	D	C	F
W Sakhalin Is.	s	?	?	C	F
Japan/East Sea	l	m	D	C	F
<i>Benizuwai Tanner crab (C. japonicus)</i>					
E Japan/East Sea	l?	m?	?	C	F?
W Japan/East Sea	l	l	?	C	D

	Abundance		Long-term Trend	Type	Status
	Historical	Current			
Hair crab (<i>E. isenbeckii</i>)					
E Bering Sea	m	m	?	C	F
Aleutian Islands	s	?	?	C	L
E Kamchatka	s	s	?	C	U
SE Kamchatka	m	m	?	C	F
Kurile Islands	m	m	?	C	F
E Sakhalin Is.	s	s	?	C	F
W Sakhalin Is.	m	s	?	C	F
Hokkaido	l	m	?	C	F
E Japan/East Sea	m	l	?	C	F
Korean Coast	m	s	D	C	F
W Japan/East Sea	m	m	?	C	F
Sand crab (<i>P. pelagicus</i>) ? Stocks					
FAO Area 61	l	?	?	C	?
Gazami crab (<i>P. trituberculatus</i>) ? Stocks					
FAO Area 61	l	?	?	C	F
Korean Coast	l	l	D	C	F
Mud crab (<i>S. serrata</i>)? Stocks					
FAO Area 61	l	?	?	C	F?
Dungeness crab (<i>C. magister</i>)					
S California	m	s	D,P	C,R	F
N Calif.-Wash.	l	l	P	C,R	F
Puget Sound	m	m	P	C,R	F
Canada, WCVI	m	m	?	C,R,S	F
Canada, ECVI	m	m	?	C,R,S	F
Canada, QCI	l	m	D,P	C,R	F
Canada, Central	m	m	?	C,R,S	F
SE Alaska	l	m	P	C,R,S	F
Cook Inlet	m	s	D,P	C,R,S	F
Kodiak	l	s	D,P	C,R,S	F
S Ak. Peninsula	m	s	D,P	C,R,S	F
E Aleutians	m	s	D	C,R,S	F
E Bering Sea	s	s	?	C	F
Red King crab (<i>P. camtschaticus</i>)					
Canada	s	s	?	C,R,S	D
S E Alaska	s	s	?	C,R,S	F
Cook Inlet	m	s	D	C,R,S	*
Kodiak	l	s	D	C,R,S	*
S Ak. Peninsula	l	s	D	C,R,S	*
E Aleutians	l	s	D	C,S	*
W Aleutians	l	s	D	C,S	*
Bristol Bay	l	s	D	C	*
Pribilof Islands	s	s	D	C,S	*/F
Norton Sound	s	s	?	C,R,S	F
E Kamchatka	s	s	P	C	F
W Kamchatka	l	s	D	C	F
NW Sea of Okhotsk	m	s/m	P	C	F
Kurile Islands	s	?	?	C	F
E Sakhalin Is.	s	s	D	C	F
W Sakhalin Is.	s/m	s	D	C	F
Hokkaido	s/m	s	?	C	F

	Abundance		Long-term Trend	Type	Status
	Historical	Current			
Blue King crab (<i>P. platypus</i>)					
SE Alaska	s	s	?	C,R,S	F
Prince William S.	s	s	?	C,R,S	*
Other G. of Alaska	s	s	?	C,R,S	*
Pribilof Islands	l	s	D	C,S	*/F
St. Matthew Is.	l	m	D	C,	*/F
N Bering Sea	s	s	?	C,S	F
Cape Navarin	m	s	D	C	F
S Koryak Coast	m	m	D	C	F
E Shelikhov Bay	l	m	P	C	F
NW Shelikhov Bay	m	m	P	C	F
St. Iona Is.	s	s	D	C	F
E Sakhalin Is.	s	s	D	C	F
W Sakhalin Is.	s	s	D	C	F
Hokkaido	s	?	?	C	F
W Japan/East Sea	s	s	D	C	F
Scarlet King crab (<i>L. couesi</i>)					
Calif.-Washington	?	?	?	?	U
Canada	?	?	?	?	U
Gulf of Alaska	?	?	?	C	D
Aleutian Islands	?	?	?	C	D
E. Bering Sea	s	?	?	C	D
W. Bering Sea	m	m	?	C	U
N. Sea of Okhotsk	l	m	?	C	U
Golden King crab (<i>L. asquispinus</i>)					
Canada	s	s	?	C	U
SE Alaska	m	s	?	C	F
Other G. of Alaska	s	s	?	C	F
E Aleutians	m	m	D?	C	F
W Aleutians	l	l	D?	C	F
Bristol Bay	s	s	?	C	F
Pribilof Islands	s	s	?	C	F
N Bering Sea	s	s	?	C	D
E Sakhalin Is.	s	s	?	C,S	U
W Sakhalin Is.	m	s	?	C	F
N Sea of Okhotsk	l	s	D	C	F
Kurile Is.	M/l	m	D?	C	F
Hokkaido	s	?	?	C	?
Shrimps					
Kuruma prawn (<i>M. japonicus</i>) ? Stocks					
FAO Area 61	l	?	?	C	F?
Korean Coast	m	m	D	C	F
Fleshy prawn (<i>F. chinensis</i>) ? Stocks					
FAO Area 61	l	?	?	C	F?
Korean Coast	l	l	F	C	F
Shiba shrimp (<i>M. joyneri</i>) ? Stocks					
FAO Area 61	l	?	?	C	F?
Korean Coast	m	m	D	C	F
Yoshi shrimp (<i>M. ensis</i>) ? Stocks					
FAO Area 61	?	?	?	C	F?

	Abundance		Long-term Trend	Type	Status
	Historical	Current			
Southern rough (Cocktail) shrimp (<i>T. curvirostris</i>) ? Stocks					
FAO Area 61	l	?	?	C	F?
Korean Coast	s	s	D	C	F
Akiami paste shrimp (<i>A. chinensis</i>) ? Stocks					
FAO Area 61	l	?	?	C	F?
Korean Coast	l	l	D	C	F
Morotoge shrimp (<i>P. japonica</i>) ? Stocks					
FAO Area 61	s	s	P	C	F
Korean Coast	?	?	?	C	F?
Sidestriped shrimp (<i>P. disper</i>)					
Calif.-Wash.	s	?	?	C	F?
N Coast B.C.	l	l	?	C	U-F
S Coast B.C.	m	s	D	C	F
SE Alaska	s	s	?	C	F
Prince William S.	l	s	D	C	F
Cook Inlet	m	s	D	C	*
Kodiak	l	s	D	C	*
S Ak Peninsula	l	s	D	C	*
E Aleutians	m	s	D	C	F
W Bering Sea	s	s	P/I	C	D
Northern shrimp (<i>P. borealis/eos</i>)					
N Coast B.C.	s	s	?	C	F
S Coast B.C.	s	s	D	C	F
SE Alaska	s	s	D	C	F
Cook Inlet	m	s	D	C	F
Kodiak	l	s	D	C	F
S Ak Peninsula	l	s	D	C	F
E Aleutians	m	s	D	C	F
E Bering Sea	l	s	D	?	?
W Bering Sea	s/m	m	?	C	D
W Kamchatka	s/l	l	?	C	D/F
N Sea of Okhotsk	m/l	l	?	C	D/F
E Sakhalin Is.	m/l	l	?	C	D/F
W Sakhalin Is.	m	m	?	C	F
N Japan/East Sea	m	m	?	C	U
Humpy shrimp (<i>P. goniurus</i>)					
Cook Inlet	s	s	D	C	*
Kodiak	m	s	D	C	*
S Ak Peninsula	m	s	D	C	*
E Aleutians	s	s	D	C	*
E Bering Sea	m?	s	D	?	U
W Bering Sea	s/l	s/m	?	C	U/D
W Kamchatka	s	s	?	C	U/D
S Sakhalin Is.	s/m	s	?	C	U/D
Hokkai shrimp (<i>P. latirostris</i>) Stocks ?					
FAO Area 61	m	m	?	C	D/F
W Japan/East Sea	m	m	P	C,R,S	D
S Sakhalin Is.	m	s/m	P	C,R,S	D/F
S Kurile Is.	m	s/m	P	C,R,S	D/F

	Abundance		Long-term Trend	Type	Status
	Historical	Current			
Ocean shrimp (<i>P. jordani</i>)					
Calif.-Wash.	l	?	P	C	F?
Offshore, B.C.	m	s	D	C	F
Inshore, B.C.	s	s	?	C	F
Spot shrimp (<i>P. platyceros</i>)					
Calif.-Wash.	s	?	?	C,R	F?
Canada	l	l	?	C,R	F
SE Alaska	l	m	D?	C,R,S	F
Prince William S.	l	m	D?	C,R,S	F
Cook Inlet	s	l	D	C,R,S	F
Northern sculptured shrimp (<i>S. salebrosa</i>)					
W Bering Sea	s	s	?	C	U
E Kamtchatka	m	m	?	C	U
Uneven sculptured shrimp					
W Bering Sea	s	s	?	C	U
E Kamtchatka	m	m	?	C	U
Spiny Lobsters					
California spiny lobster (<i>Panulirus interruptus</i>) Stock ?					
S California	s	s	?	C	F
Hawaii	m	m	P	C	F
Japanese spiny lobster Stock ?					
SE Japan					
Inland sea (<i>P. japonicus</i>)					
Mantis Shrimps Stocks ?					
Chinese mantis shrimp (<i>O. oratoria</i>)					
Bohai Sea	l	l	P	C	F