

**INTER-AMERICAN TROPICAL TUNA COMMISSION**  
**1<sup>ST</sup> TECHNICAL MEETING ON DORADO**

**Review current state of knowledge and identify available data sources for dorado in the eastern Pacific Ocean**

**14-16 October 2014**  
**Manta, Ecuador**

**REPORT OF THE MEETING**

**Appendix 3.**

**Data table**

Data type	Source	Description
<b>BIOLOGY</b>		
Age and growth	Sofia Ortega (CICIMAR-Mexico)	Analysis of age and growth done with sportfishing fleet data, 2004-2006, with scales. There is a collection of otoliths that have not yet been analyzed, and separated by sex, and analyses of modal composition available.
	Manuel Ixquiac (Guatemala)	Analysis of age and growth done with data for the artisanal longline fleet, 2006-2008, by sex, length.
	Yuli Cagua (SRP-Ecuador)	Analysis of age and growth done with scales and otoliths (available), 2008-2012. Sexes separated. Age- and sex-composition data available.
	Carlos Goycochea (IMARPE-Peru)	Analysis of age and growth done with otoliths (microincrements 2010), by sex.
Length-weight relationship	Sofia Ortega (CICIMAR, Mexico)	Sexes separated, 2002-2013. Possibly other sources of data in the south Mexico.
	Manuel Ixquiac (Guatemala)	Sexes separated, years 2002, 2006-2008.
	Yuli Cagua (SRP-Ecuador)	Sexes separated. Analysis by port, 2008-2012
	Amado Solano (IMARPE-Peru)	Sexes separated, fishery survey data, 2006-2008 and 2010. Monitoring of artisanal fisheries, annual, 2008-2014.
	Luis Zapata and Rodrigo Baos (WWF-Colombia)	Sexes separated, 1994-1996, and 2009-2014, longline fleet.
Maturity	Sofia Ortega (CICIMAR, Mexico)	Stages of maturity (macro and micro histological method), sex ratios, condition factor, length at first maturity. Gonadosomatic index
	Ángel Vega and Héctor Guzmán (Panamanian Pacific)	Data from the Gulf of Panama. Macroscopic analysis of gonads (over 90% of the individuals were identified as sexually mature), 2006-2009. Sexes not separated. By maturity stage.
	Francisco Lavayen (SRP-Ecuador)	Analysis by port, 2008-2012. Maturity stages, macro and microscopic. Sex ratios. Condition factor. Length at first maturity. L50% (sexes separated).
	Javier Sánchez and Amado Solano (IMARPE, Pe-	Stages of gonadal maturity (macro and microscopic). Length at first maturity, average length at spawning. Sexes

Data type	Source	Description
	ru) Luis Zapata and Rodrigo Baos (WWF-Colombia)	separated, with data for 2006-2010. 1994-1996: hepatosomatic (IHS), gonadosomatic (IGS) indexes, condition factor.
Fecundity	Sofia Ortega (CICIMAR, Mexico) Héctor Guzmán Pedro Véliz (SRP-Ecuador) Javier Sánchez and Amado Solano (IMARPE, Peru)	Partial fecundity by age group, 2004-2006.  Data for the Gulf of Panama, 2006-2009. Average partial fecundity, 2011-2012. Relationship with temperature. Relative fecundity, 2006-2010.
Sex ratios	Sofia Ortega (CICIMAR) Manuel Ixquiac Héctor Guzmán and Ángel Vega Luiz Zapata and Rodrigo Baos (WWF-Colombia) Christian Bustamante (AUNAP) Javier Sánchez and Amado Solano (IMARPE, Peru)	2002-2013. Data for 2002 and 2005-2008 Panamanian Pacific, 2006-2009.  Sex ratio data (2009-2014).  Colombian Pacific observer program, 2012-2013.  Sexes separated, fisheries survey data, 2006-2008 and 2010. Monitoring of artisanal fisheries, annual, 2008-2014.
Mortality/ exploitation status	Sofia Ortega (CICIMAR)  Juana López (CIBNOR)  Manuel Ixquiac (Guatemala) Miguel Ñiquen, Edward Barriga, Wilbert Marín, Amado Solano (IMARPE, Peru)	Exploitation status (F/Z), artisanal fleet, industrial fleet. Analysis by length, Jones method, 2004-2006. Exploitation status (F/Z), artisanal fleet, industrial fleet. Analysis by length, Jones method, 2005-2007. Exploitation status (F/Z), artisanal fleet, industrial fleet. Analysis by length, Jones method, 2002 and 2008. Total mortality rates Z (2010). Assessment with Schaefer model (1999-2009).
Food habits	Manuel Ixquiac (Guatemala) Sofia Ortega (CICIMAR) Pepe Espinoza and Ana Alegre (IMARPE, Peru) Christian Bustamante (AUNAP) Luis Zapata and Rodrigo Baos Mariuxi Moreira (SRP-Ecuador)	Stomach content data (2008)  Food habits analysis of of the sportfishing fleet, 2002-2013. Food habits analysis (ontogenic, by length). Multivariate regression trees (CART). Trophic ecology, 1998-2014. Food habits analysis, trophic assemblages associated with FADs, 2009-2011 1994-1996: index of prey frequency, index of relative abundance and percentage in number. Food habits study (Oct 2008-Feb 2012). By sex, length and ecological index.
Stock structure	Díaz-Jaimes, Tripp-Valdéz and Rocha-Olivares  Emmerik Motte (Concepto Azul)	Mitochondrial and microsatellite molecular genetic analysis.  Molecular genetic analysis of a mitochondrial gene.

Data type	Source	Description
	Susana Caballero (Univ. de los Andes, Colombia)	Molecular genetic analysis of 5 microsatellites, and 2 mitochondrial genes. Sampling from November 2010 to December 2011.
Others	(CEDEPESCA, Panama) Cristiano Araujo and Rigoberto Rosas (ULEAM) Amado Solano (IMARPE, Peru)	Productivity and Susceptibility Analysis (PSA), 2013. Studies of heavy metals, 2013-2014. Study of stable isotopes, just starting. Parasite studies. 2008 data.
<b>FISHERIES DATA</b>		
<b>Catch</b>		
Purse seine	IATTC observer and log-book databases	Effort (number of sets) 1993-present. Total bycatch (number of individuals), 1993-present. Large vessels (class 6): bycatch per set x total sets.
Tuna longline (high seas)	IATTC longline database. (Contact countries involved)	Effort 1993-present. Of: 1) sum of effort data 5x5; or 2) the totals prorated with effort 5x5
Mexico	FIDEMAR, INAPESCA CONAPESCA, IATTC and CICIMAR	Spatial distribution of the average annual bycatch of dorado (in numbers of individuals) with the data for 50% of the Mexican tuna purse-seine fleet that operated in the Mexican Pacific Exclusive Economic Zone (EEZ) 2000-2007, for the Mexican longline fleet, 1997-2002 and 2010, and for sport-fishing, 2000-2014 (source: CICIMAR).
Central America	Vinicio Juárez (DIPESCA, Guatemala) CEDEPESCA, ASOPEACE, Asociación San José and Empresa Pesca SA. (Guatemala) José Carvajal (INCOPESCA, Costa Rica)  Edwin Medina (CEDEPESCA, group PANALANG, Panama) OSPESCA	Catch composition by fleet (artisanal and industrial; 2000-2014). Export data, 2008-2014. Catch, effort, export data.  Historical data, 1990-2012 and exports and imports, 2010-2013. Species composition data since 2006 (longline fleet). There are also composition data for the fleets (Costa Rican vessels). Export data based on the classification of dorado by weight (large: >10lb, medium; 5-10lb, small: < 5lb), 2008-2014.  Will facilitate the data contributions (if any) of countries not present at the meeting.
Colombia	Luis Zapata and Rodrigo Baos (WWF-Colombia)  Christian Bustamante (AUNAP)	Effort in days fishing (2006-2014). Total days/month, average days/month. Active/inactive fleet. Detailed description of gear. Various sources of catch data on the Pacific coast of Colombia (1993-2014). Spatiotemporal analysis of the tuna fishery, its bycatches by part of the foreign fleet in Colombian waters. Composition of the catches by species and type of tuna set (2009-2011). Correlations between these data and environmental variables.
Ecuador	Molke Mendoza (SRP-Ecuador)	Areas of the occurrence of dorado with the data of the longline fleet targeting dorado and tuna, billfishes and sharks

Data type	Source	Description
	INP	(TBS), during 2008-2012 as well as the seasonality of the unloadings of the artisanal fishery: surface longline and surface gillnets, 2008-2012. Time series of catches, 2008-2013, by gear. Historical data series since 1980 (statistical yearbooks).
Peru	IMARPE, PRODUCE, WWF-Peru: Samuel Amoros	Unloadings: annual (1990-2014), monthly (1997-2014). Artisanal longline fleet. Relationship of monthly unloadings with environmental data (sea surface temperature, sea surface salinity, oxygen; 1997-2014). Effort (2000-2014): number of trips, duration of trips, effective hours, number of hooks. On-board data (fisheries surveys 2008 and 2010), on-board observations, fishing logbooks, 2013-2014.
<b>Length composition</b>		
Purse seine	IATTC observer database (large vessels only)	Length-composition data: 1) Length categories (< 30 cm FL; 30-60 cm FL; > 60 cm FL), 1993-2010
Tuna longline (high seas)	Do not exist, Alex da Silva will contact colleagues	
Mexico	Sofia Ortega (CICIMAR). INAPESCA (fleet longline)	Length composition of the catches of the sportfishing fleet (2002 -2013). Longline fleet, 2005-2011 data.
Central America	Eduardo Juárez (INPESCA), Manuel Ixquiatic (Guatemala)	Length composition of the catches of the artisanal longline fleet (2005-2008). Catch composition classified by marketable lengths of the industrial fleet (large, medium, small), 2000-2014.
	Héctor Guzmán and Ángel Vega	Average lengths (Gulf of Chiriqui and Gulf of Panama area). Artisanal longline fleet. Average lengths.
Colombia	Luis Zapata and Rodrigo Baos (WWF-Colombia) Christian Bustamante (AUNAP)	Length composition, 1994-1996 and 2009-2014. Sexes separated. Composition by length class and set type, tuna purse-seine fishery.
Ecuador	Molke Mendoza (SRP-Ecuador), Jimmy Martínez (WWF-Ecuador) INP	Length composition with the data of the artisanal longline fleet targeting dorado and tuna, billfishes and sharks (TBS) (2008-2012). Monthly data. Sexes separated. Length structure data artisanal longline fleet, 1989-1993 and 2006-present.
Peru	Miguel Ñiquen, Edward Barriga, Wilbert Marín, Amado Solano (IMARPE)	Size structure of dorado in Paita, total by years, 2000-2014. Monthly, 2008-2014. By sex and total. Length distribution by hook size (selectivity), 2008-2010.
<b>Indices of abundancia</b>		
Purse seine	IATTC observer database (large vessels only)	See Aires-da-Silva <i>et al.</i> 2014. IATTC Document SAC-05-11b
Tuna longline (high seas)	Do not exist. Alex da Silva will contact colleagues.	
Mexico	Sofia Ortega (CICIMAR)	Catch data for the sportfishing fleet, 2002-2013.
Central America	Manuel Ixquiatic (Guatemala) Héctor Guzmán	Abundance (CPUE) of dorado and sea-surface temperature (SST); Relationship of abundance of organisms ln(org) (2004-2007 and SST °C). Information obtained by part of the artisanal fleet of the

Data type	Source	Description
		Gulf of Panama on abundance is 104kg/day/vessel.
Colombia	Luis Zapata and Rodrigo Baos (WWF-Colombia)	Data for the industrial longline fleet. Monthly CPUE (1994-1996)
Ecuador	Jimmy Martínez (WWF-Ecuador) en colaboración with Cleridy-Lennert-Cody and Alex da Silva (IATTC)	Analysis of standardised CPUE (GAM). See Aires-da-Silva <i>et al.</i> 2014. IATTC Document SAC-05-11b
Peru	Miguel Ñiquen, Edward Barriga, Wilbert Marín, Amado Solano (IMARPE).	Catch and effort by fishing season, 1998-1999, 2013-2014. (CPUE ton/trip). Standardisation of CPUE with data for the artisanal longline fleet 1999-2009 (GLM). Network of IMARPE field observers. By area (North, Central, South), three fleet categories.
<b>Management measures</b>		
Mexico		Prohibition of commercial fishing for dorado; resource available only for sportfishing within 50 miles of the EEZ.
Centroamérica	INCOPECA, Costa Rica  CEDEPESCA, Panama	Restriction of fishing effort for new entrants to the longline fishery. Prohibition on fishing on FADs in the tuna purse-seine fishery since 1999. Prohibition of fishing in marine national parks. Freeze on issuing of new licenses for fishing for the species; use of longlines allowed only for vessels of less than 6 GRT; a method of hand fishing is implemented; the number of hooks on the longline is limited to 800 per line or vessel.
Colombia	AUNAP	Annual quota of 2000 tons for catches of dorado by industrial longline, since 2013. Exclusive zone for artisanal fishing (ZEPA), of 2.5 miles to the north of Chocó. Exclusive fisheries management zone (ZEMP), 12 miles.
Ecuador	SRP	National Plan of Action for the Conservation and Management of the Dorado Resource in Ecuador (PAN-Dorado). Control and Surveillance System. Minimum catch length limit (80 cm TL). Time closure implemented from 1 July to 7 October (Ministerial agreement 070, May 2011). Incidental catches of 2% allowed during the closure for purse-seine vessels, and 8% for longline gear. Regulations limiting fishing effort to motherships in the dorado season to 10 fiberglass boats, and up to 6 for the TBS fishery.
Peru	PRODUCE	Ministerial resolution no. 249-2011-PRODUCE: minimum catch length of 70 cm FL is established, with a 10% tolerance. Ministerial resolution no. 245-2014-PRODUCE: a fishing season for the dorado resource is established from 1 October to 30 April each year.