Standardization of longtail tuna catch rates of drift gillnet fisheries in Sultanate of Oman

Al-Siyabi, Al-kharusi, Nishida
and Al-Busaidi

Why do we need to do CPUE Standardization?

Nominal (Raw) CPUE are affected (biased)
by various factors such as year, season, ENV, etc,

Need to adjust such affects to create
unbiased CPUE by statistical approaches
(GLM, GAM etc)

Then **Maybe** more realistic abundance trends
can be observed

Longtail tuna : ecology

Surface-dwelling, costal and migratory neritic species

but not found in turbid low-salinity waters (Randall, 1995)

Feeds on fishes, crustaceans and cephalopods (Collette, 2001).

Biological information (Oman)

Recent neritic tuna project (2012-2014)
Sampling : size, weight, age, maturity, genetic etc

(I believe) Omani scientists will provide results later.

Some provisional results …

Sexual maturity is reached
when the fish is about 66-67 cm

Spawning season : May to August (peak :July)

Major fishing vessels (Oman)

4 types of small-scale traditional boat (Stengel and Al Harthy, 2002).

Major gear + boast + fishing ground targeting longtail tuna

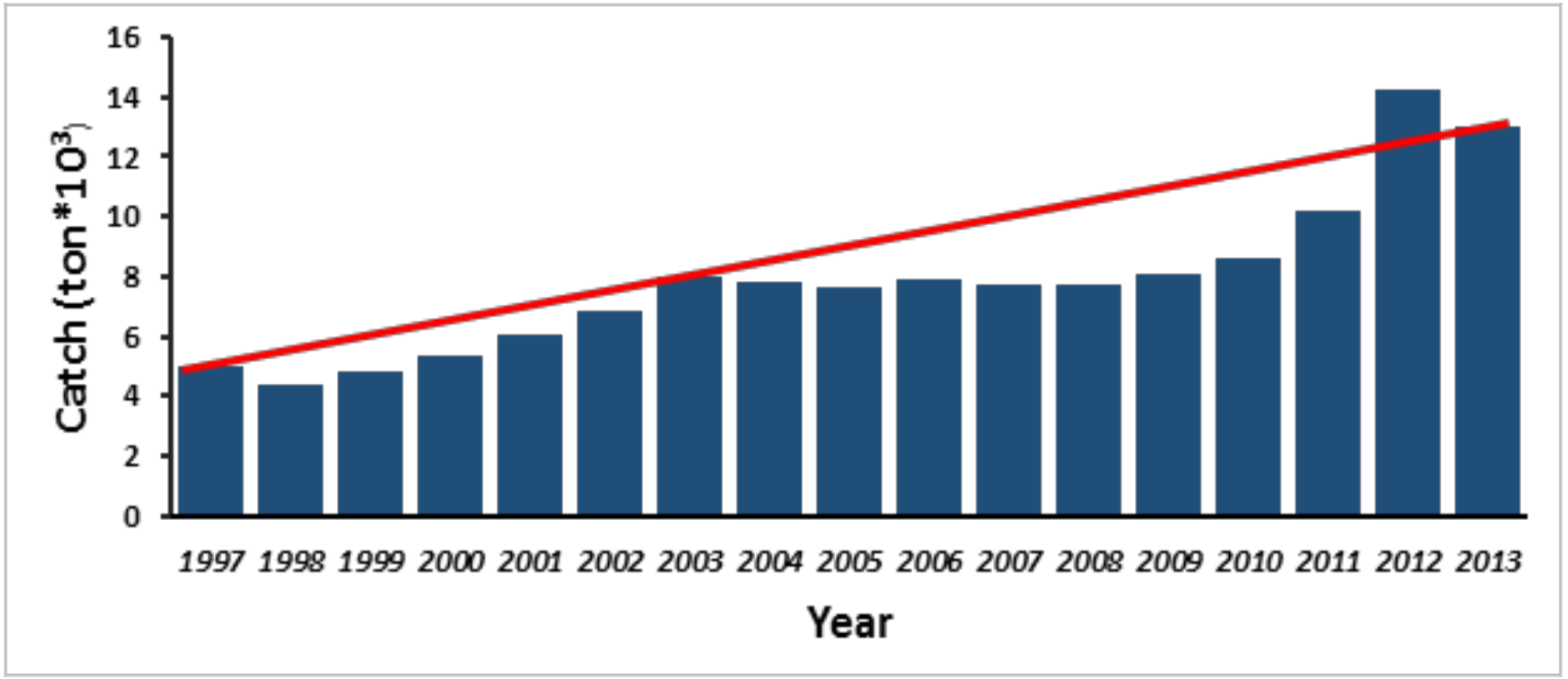
Drift gillnet by fiber glass boat

Al-Sharqiyah area

covering

both Oman Sea and Arabian Sea

Longtail catch trends (1997-2013) increasing trend from 5,000 to 14,000 tons



Statistical section,
Ministry of Agriculture & Fisheries, Sultanate of Oman

Nominal CPUE

Longtail tuna catch and effort data (2002-2013)

Statistical section,
Ministry of Agriculture & Fisheries
Sultanate of Oman

Data in 2013 is not available
(accidentally deleted during data processing)

Nominal CPUE

Drift gillnet by fiber glass boat

Al-Sharqiyah (major fishing ground)

covering both Oman Sea and Arabian Sea

(Nominal CPUE: stable and reliable)

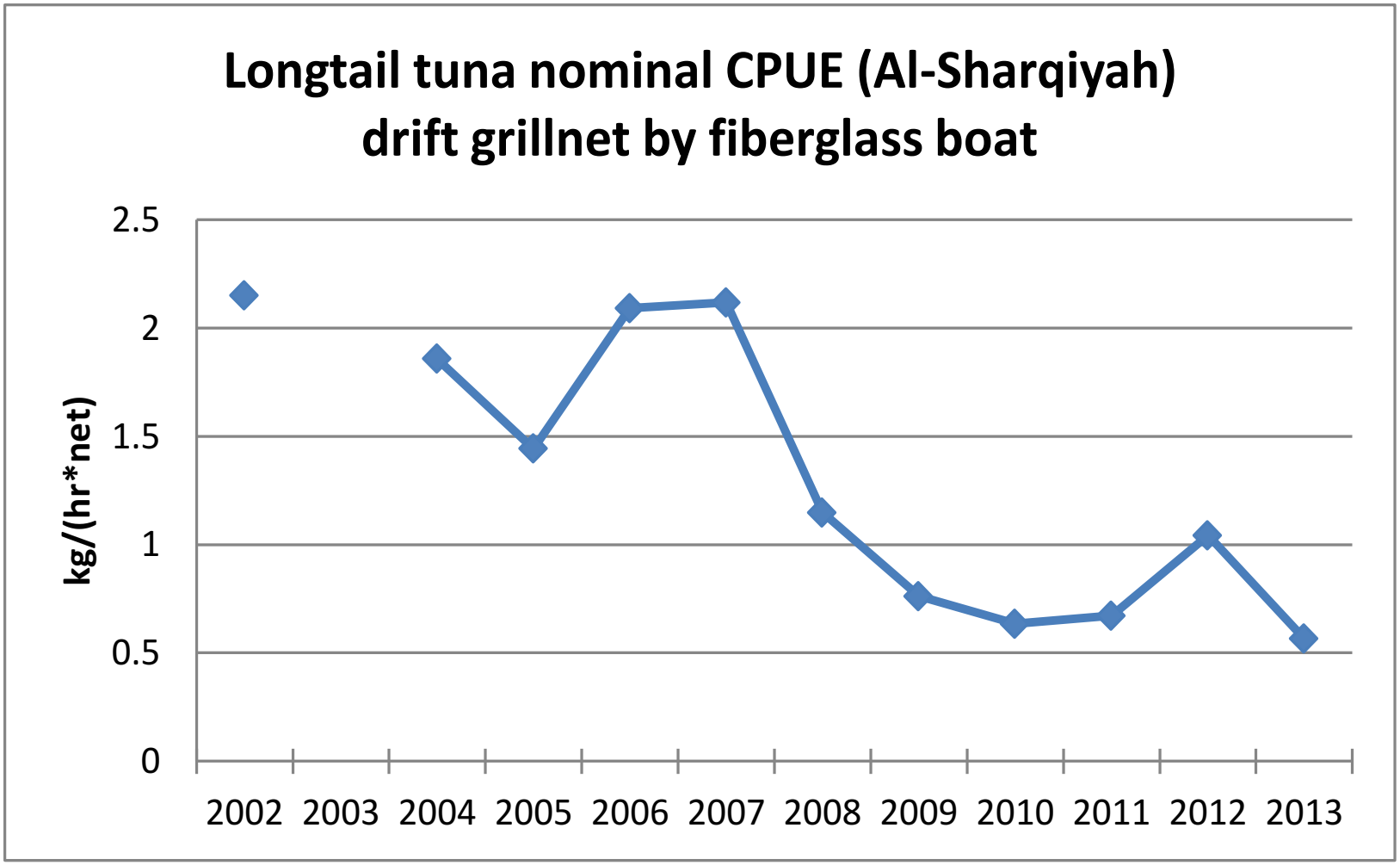
Other fishing grounds

No. of operations (drift gillnet by fiber-glass boat)

much less than in Al-Sharqiyah (unstable)

nominal CPUE are not stable and reliable

Nominal CPUE(kg/fishing hours*net)



CPUE standardization (log normal GLM)

Log (CPUE+c) = (mean) + [Y] + [Q] +[Crew] + (error)

*CPUE : kg/(gillnet unit*fishing hours)*

C : 10% of average overall nominal CPUE (Campbell and Nishida, 1998)

Y : effect of year

Q : effect of quarter(season)

Crew : crew (boat size) effect

Results
Major factors affecting Nominal CPUE Year + season (quarter)
Boat size (crew) less important factor

The GLM Procedure

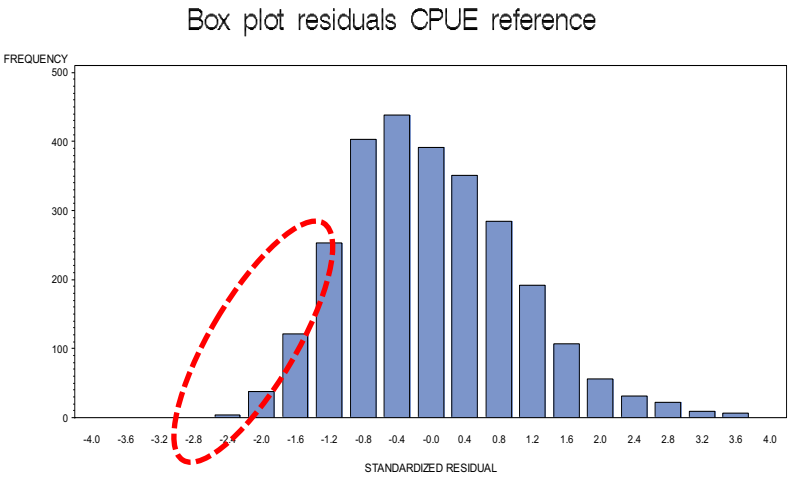
ependent Variable: L_CPUE

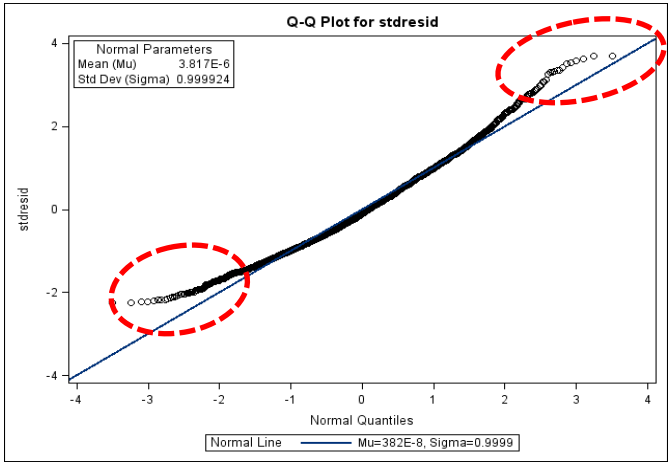
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	22	561.998414	25.545382	33.29	<.0001
Error	2688	2062.589716	0.767332		
Corrected Total	2710	2624.588130			

R-Square	Coeff Var	Root MSE	L_CPUE Mean
0.214128	-436.0233	0.875975	-0.200901

Source	DF	Type III SS	Mean Square	F Value	Pr > F
yr	10	396.3105287	39.6310529	51.65	<.0001
q	3	127.8215908	42.6071969	55.53	<.0001
crew	9	52.3305018	5.8145002	7.58	<.0001

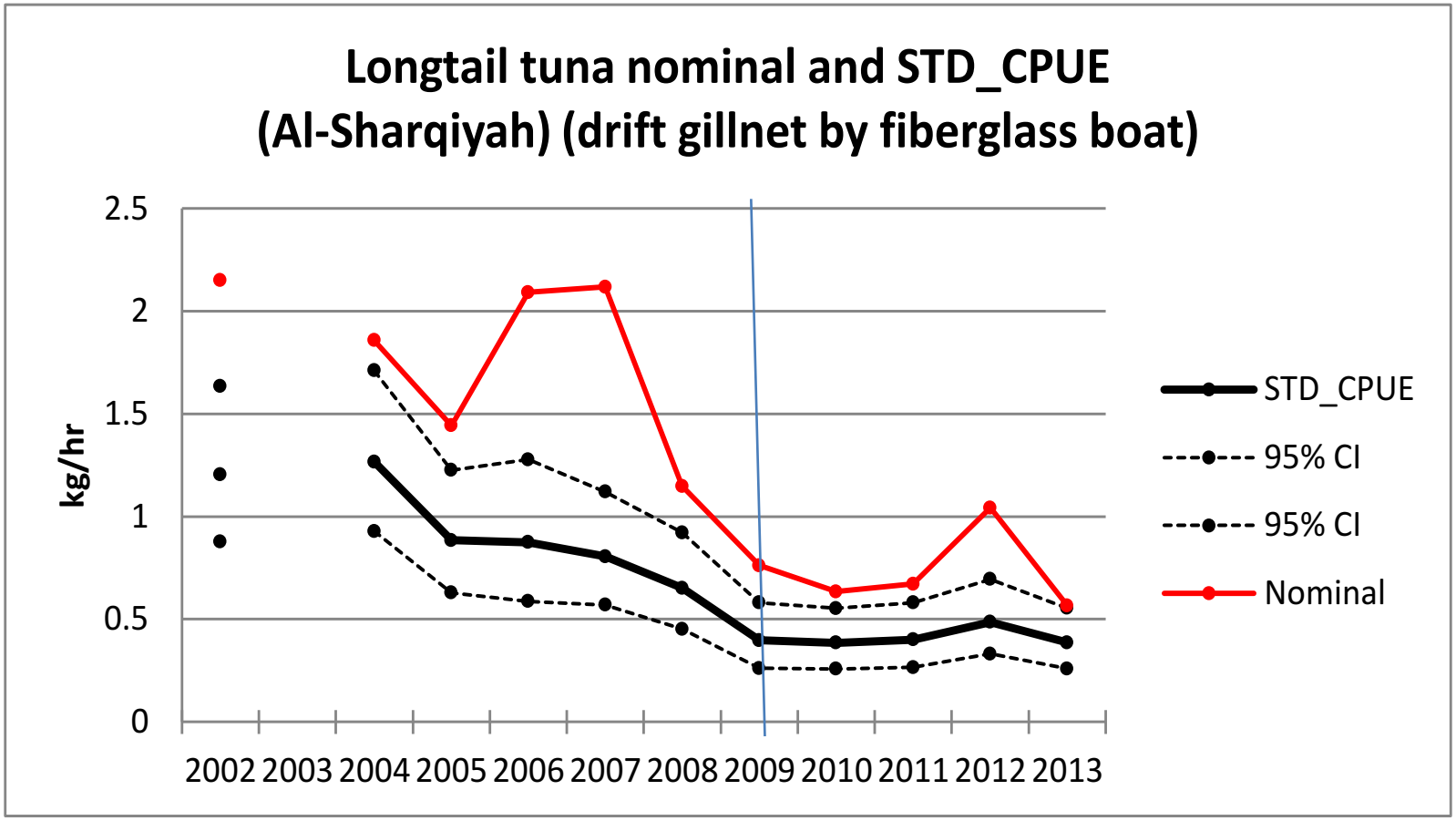
Goodness of Fitness
generally fitness is OK but some skews
future ➔ explore other models (negative binominal)





Result summary : Standardized CPUE (drift gillnet)

Decrease (2002-2009)➔stabilized in the low level (2010-2013)



Summary

Standardized longtail tuna CPUE

Drift gillnet (fiber glass boat)

ขอบคุณครับ thank you Thailand

Working Party on Neritic Tunas
(4th Session)
22th June – 2nd July 2014