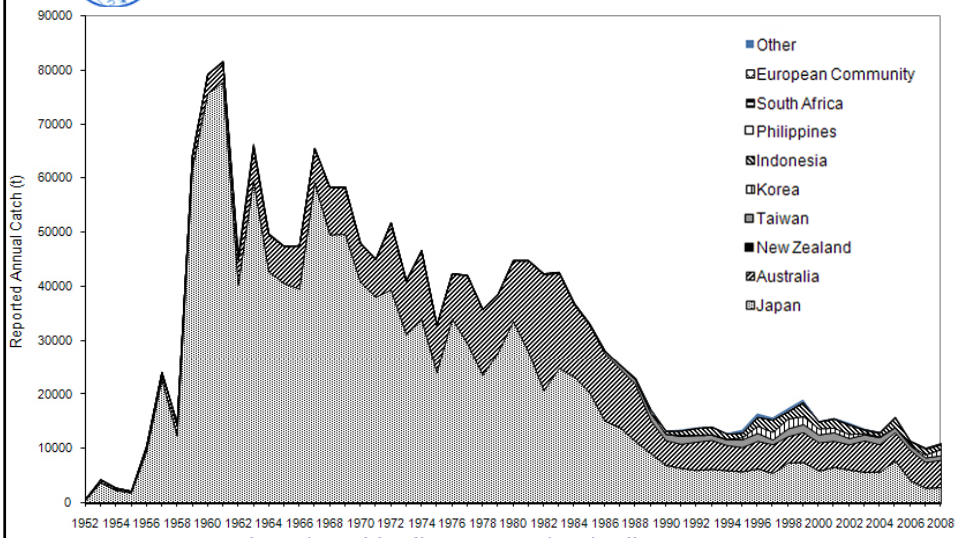
REPORT OF THE 14th MEETING OF THE SCIENTIFIC COMMITTEE

Busan, 5 – 11 Sep 2009

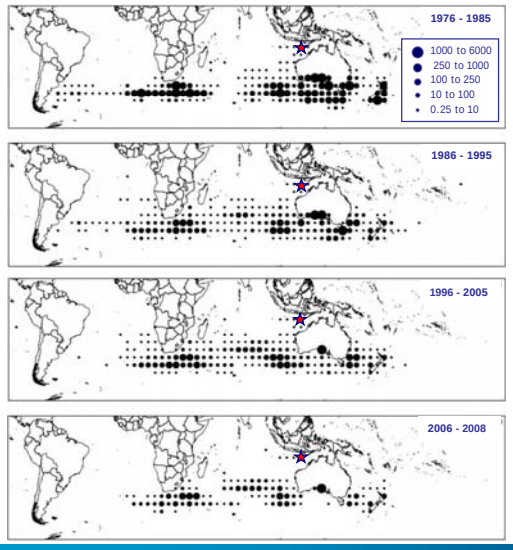
Review of SBT Fisheries and Fisheries Indicators

Reported SBT Global Catches: 1952 – 2008



Reported southern bluefin tuna catches by flag, 1952 to 2008

SBT Distribution Range: 1976 – 2008



Geographical distribution of average annual southern bluefin tuna catches (t) by CCSBT members and cooperating non-members over the periods 1976-1985, 1986-1995, 1996-2005 and 2006-2008 per 5° block by oceanic region. The area marked with a star is an area of significant catch in the breeding ground. Block catches averaging less than 0.25 tons per year are not shown. Note: This figure may be affected by past anomalies in catch.

Trends in juvenile abundance

Aerial Surveys in the Great Australian Bight (GAB)

- The updated median of the Australian scientific aerial survey was below the 2005-08 average. However, this survey fluctuated with no clear trend over 2005-09
- The median of the commercial spotting (SAPUE) index was below the median of the 2002-09 average

Trolling Index in Western Australia

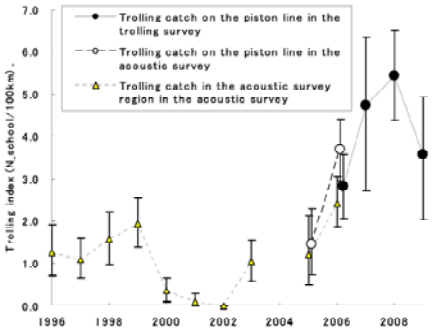
- The median of the trolling index was below the 2006-09 survey

Trends in juvenile abundance (continued)

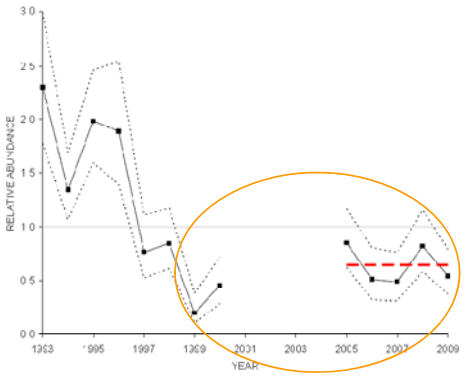
Acoustic surveys and Longline CPUE

- The indices from the acoustic surveys that ended in 2005-06 suggested low recruitments for four years (the 1999-2002 year classes)
- The same trend is shown in the commercial longline CPUE that suggested low recruitment for these year classes
- However, there are some inconsistencies between the recruitment indices observed in the longline CPUE and acoustic surveys

Recruitment Indicators

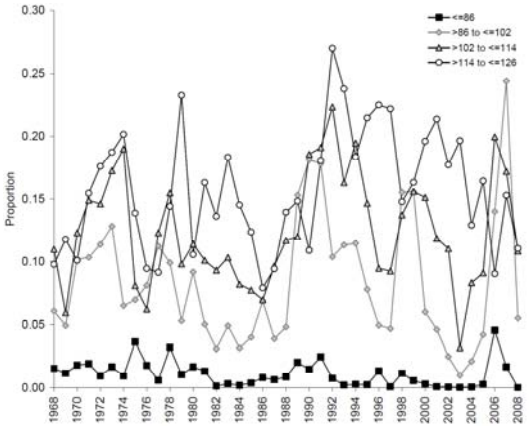


Trends of trolling catch index of age 1 SBT in the Western Australia.

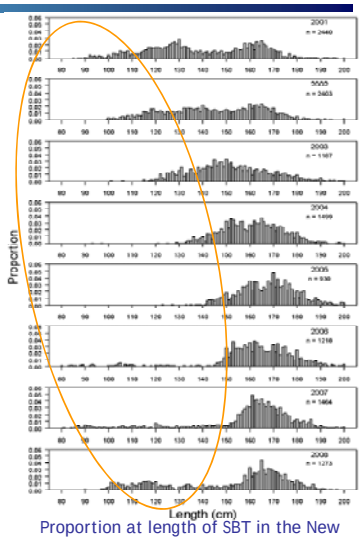


Aerial survey index of relative abundance of juvenile SBT in the Great Australian Bight, Jan to Mar (2009 value represents the 2008–09 fishing season, etc). Dotted lines are 90% confidence intervals. Dashed horizontal line represents the average 2005–09 median value

Recruitment Indicators



Size composition (proportion of total catch) of juvenile SBT caught by Japanese longliners in statistical areas 4-9, months 4-9, where age 0-2≤86 cm, 86 cm<age 3≤102 cm, 102 cm<age 4≤114 cm, 114 cm<age 5≤126 cm..



Proportion at length of SBT in the New Zealand charter fleet for 2001 to 2008

Trends in age 4+ SBT

Overall trends

- Indicators of age 4+ SBT exhibited some upward trends

New Zealand fishery

- CPUE in both the charter and domestic fisheries increased in 2008 compared with 2007, with ages 4 and 5 SBT comprising a greater proportion of the catch

Indonesian fishery

- Mean and median age of SBT caught on the spawning grounds increased in 2008 compared with 2007, continuing the trend observed since 2004-05

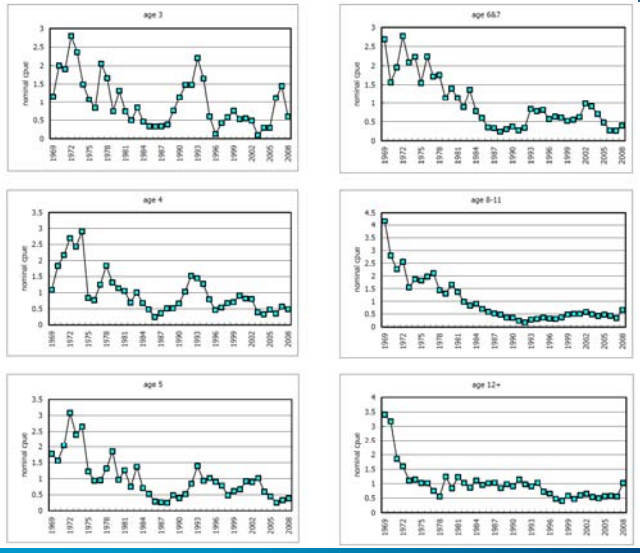
Trends in age 4+ SBT

Japanese longline fishery

- Standardised CPUE indices for ages 4 and 5 show increasing trends in 2004-05 for 2003-04 year classes*
- CPUE indices for ages 6 and 7 show steadily declining trends over the past seven years, except for some increases in the last two years*
- CPUE for ages 8-11 and 12+ show increases or no trend after 2003, with some increases in the last two years*
- Current stock levels for these latter two age groups are still low and similar to past levels

* Fisheries management and operational changes since 2006 mean 2007 & 2008 CPUE may not be directly comparable to earlier years

Spawning Biomass Indicators



Nominal CPUE of Japanese longline fishery by cohorts for age 3,4,and 5.

Results of Scenario Modelling

Introduction

- The ESC used a reconditioned Operating Model (OM) as a basis for constant catch projections at its 2009 meeting (ESC14)
- The results from the output of the Operating Model and Management Procedure technical meeting (OMMP) held in July 2009, as well as additional work at ESC14, were used to assess stock status and the implications of future constant catch projections using:
  - a "base case",
  - and six alternative "plausible" scenarios

Results of Scenario Modelling
Current Stock Status

Spawning biomass

- Spawning biomass (SSB) is at a very low level:
  - Base case – 4.6% of unfished, with a 90% probability of 3% to 8%
  - Plausible scenarios - median range of 3.6% - 5.1% of unfished
  - Little larger than 15% of MSY biomass level

Results of Scenario Modelling
Current Stock Status

Spawning biomass (continued)

- These 2009 results differ from those in ESC13 in 2008 that indicated SSB was likely to be < 10% unfished levels, with a range from 6.6% to 13.2%
- This difference due to revisions of the OM and new data and not that SSB halved between 2008 and 2009

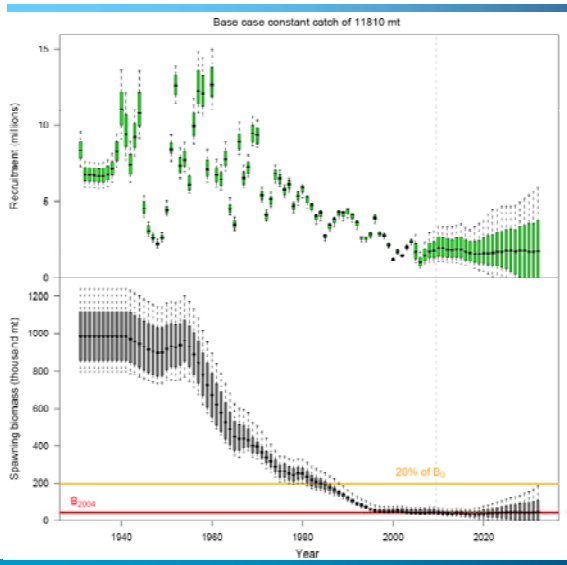
Results of Scenario Modelling
Current Stock Status

Spawning biomass (continued)

Trajectories of SSB show the following:

- Continuous decline from late 1950s to late 1970s
- Subsequent short period of stabilisation followed by further decline to mid 1990s to very low levels
- SSB remained low until early 2000s, followed by an even further decline from 2002
- There is no evidence of spawning stock rebuilding

Results of Scenario Modelling
Current Stock Status



Recruitment and spawning stock biomass for the base case, showing the medians, quartiles and 90th percentiles, together with reference points of 20% of pre-exploitation spawning stock biomass(SSB0) and the spawning stock biomass in 2004 (SSB2004). Projections of future spawning stock biomass and recruitments commence at the dashed vertical line assuming a constant catch equal to the current TAC (11,810t).

Results of Scenario Modelling Recruitment

Trends in Recruitment

- Recruitment during the last two decades are estimated to be well below the levels of the 1950 – 1980 period.
- Recruitment in the 1990s fluctuated at a low level without any overall trend
- Recruitments for the 2000-02 year classes were poor
- Recruitments for 2003-04 were somewhat stronger, though not as large as the average in the 1990s

Results of Scenario Modelling

Trends in Recruitment (continued)

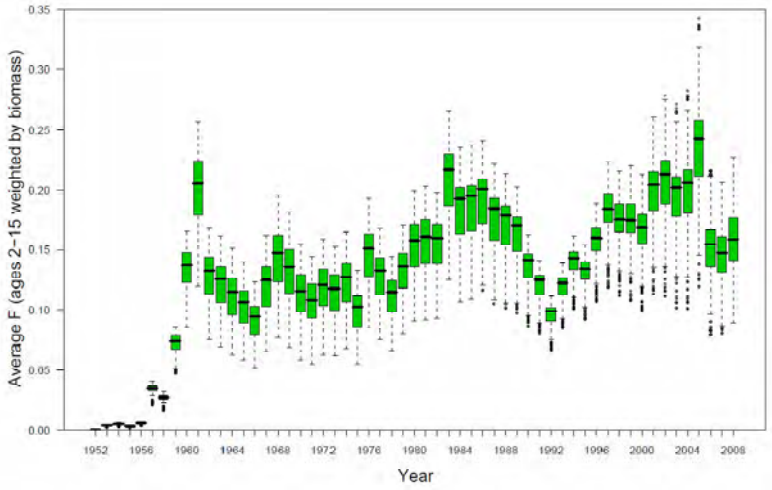
- Recruitments from 2005 cannot be estimated precisely yet
- Although some data give positive signals, it is also probable that some of these year classes were as weak as those in 2000-02
- The weak 2000-02 year classes are now evident as a gap in the size composition taken by the longline fleets
- This will have a negative impact on the spawning stock as they move into the spawning stock in the next 5 years
- This is evident as a dip in the spawning stock in the stock projections

Results of Scenario Modelling
Fishing Mortality

Fishing Mortality Rates

- Average fishing mortality peaked in 2005, decreased in 2006, and remained about the same in 2007 and 2008
- This recent reduction in fishing mortality indicates that management measures implemented in 2006 have had a positive impact during 2006-08
- For the base case the current fishing mortality is about 1.9 times the rate that would achieve MSY
- Estimates of fishing mortality for plausible scenarios range from 1.75 to 2.35 times the rate that would achieve MSY

Current Fishing Mortality



Instantaneous fishing mortality averaged over ages 2-15 (weighted by biomass) for the full base case from 1952 to 2008.

Results of Scenario Modelling Projections

Constant catch projections

ESC14 reported SSB projections for a range of catches ranging from 0 t to 15,810 t against the following two reference points:

- The ratio of B2014/B2004 and the probability that B2014>B2004 (the target probability requested in 2005 was that there is a 50% chance that B2014>B2004)
- The ratio of B2025/B2009 and the probability that B2025>B2009 (as requested by the SFMWG in 2009)

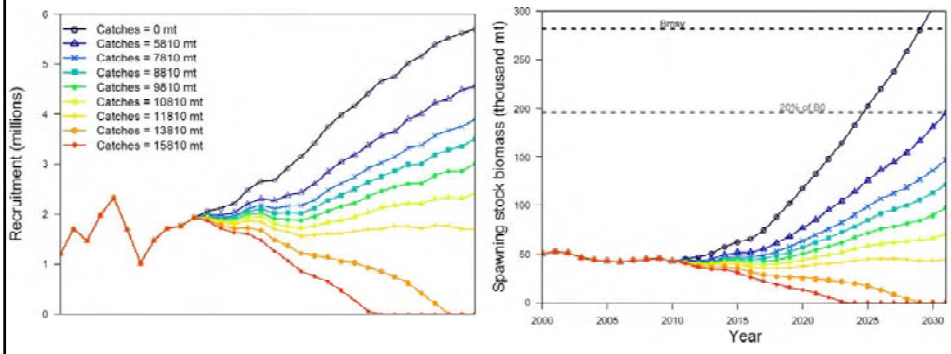
Results of Scenario Modelling Projections

Constant catch projections for base case

- At the current TAC of 11,810 t the median SSB in 2014 will be about 11% less than the median in 2004
- A future constant catch level of about 8300 t or less is required to achieve the short term reference level of a 50% probability that B2014>B2004
- The interim rebuilding target of 20% of unfished SSB is unlikely to be met over the 20 year projection period with any catch scenario tested – only the lowest catch level of 5810 t even approached the rebuilding target
- Catches at the current TAC of 11,810 t or higher increase the risk of future recruitment remaining low or declining, relative to projections with lower catches

Base case projections are shown in Table 1 of the ESC14 report

Base Case



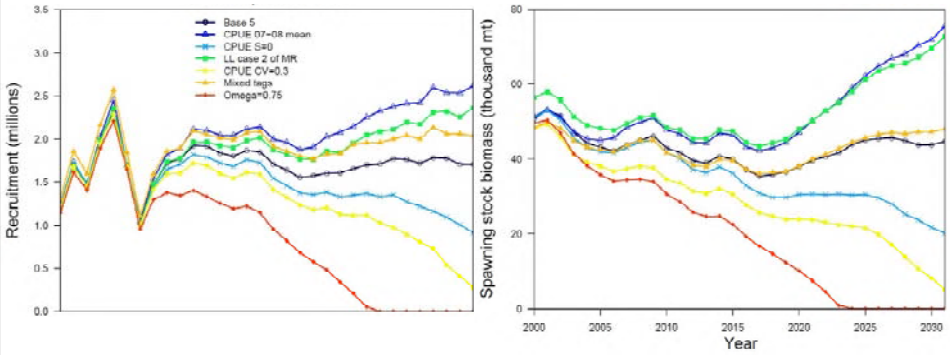
Median recruitment and spawning stock biomass for the base case projected for a variety of levels of constant catches. The 11,810t projection corresponds to the current TAC. Note that median recruitment from 2000-2008 is based on estimates of the abundance of year classes that have already entered the stock. Estimates of median recruitment beyond 2008 are estimated using the model stock - recruitment relationship and assume that this relationship holds for future levels of spawning stock biomass. Consequently, estimates of future recruitment are more uncertain.

Results of Scenario Modelling Projections

Constant catch projections for "plausible" scenarios

- Current B is very low for all 6 scenarios and well below the level that would produce MSY
- Even under the most optimistic scenario, SSB does not reach 20% of unfished SSB over the projection period for any future constant catch level considered
- For the most pessimistic scenarios, SSB is 4% of unfished SSB and predicted to decline for most future catch levels

Sensitivity Tests 11810



Median recruitment and spawning stock biomass for the 6 plausible scenarios for projections assuming future catches equal to the current TAC (11,810t). Note that median recruitments from 2000-2008 are based on estimates of the abundance of year classes that have already entered the stock. Estimates of median recruitment beyond 2008 are estimated using the model stock - recruitment relationship and assume that this relationship holds for future levels of spawning stock biomass. Consequently, estimates of future recruitment are more uncertain.

Assessment of Stock Status

Status of the SBT Stock

Spawning stock biomass

- SSB remains at a very low level, typically about 5% of unfished SSB and a little more than 15% of the B that produces MSY
- There is no sign of spawning stock rebuilding

Recruitment

- Recruitment since 2005 can't be estimated precisely, but it is probable some of these year classes are as weak as the poor 2000-02 year classes
- As the poor 2000-02 year classes move into the SSB over the next few years, there will be a negative impact on SSB

Status of the SBT Stock

Constant catch projections

- For the base case projections with the current TAC of 11,810 t, SSB declines in the short term (to 2013) and remains lower than the current level in the longer term (to at least 2025)
- The same is true for nearly all the "plausible" scenarios
- To rebuild the spawning stock and thereby reduce the risk of further poor recruitments in the short term, a reduction in the current TAC is required

Status of the SBT Stock

Overview

- Rebuilding the SSB would almost certainly increase sustainable yield; however, the risks that rebuilding may be jeopardised by future poor recruitments have probably increased since the last assessment
- Because SSB is very low, it may not provide security against adverse environmental effects leading to poor recruitment
- Short term projections are relatively reliable; however, longer term projections are more uncertain as they depend on future recruitments whose levels are determined by an estimated stock-recruitment relationship

Management Advice

2009 Management Recommendations

In the light of current stock status and concerns, management advice is as follows:

Positive factors affecting sustainability are:

- The reported catch has reduced over recent years
- Indicators and the assessment suggest that the 2003-04 year classes are not as weak as those from 2000-02
- Indicators of age 4+ SBT have exhibited some recent upward trends

2009 Management Recommendations (continued)

Serious sources of concern for sustainability

- A very low SSB (about 5% of unfished SSB and 15% of the B that will produce MSY)
- Three poor recruitments from 2000-02, and indications of further poor recruitment after 2004, which will lead to further decline in SSB
- General decline in recruitment since about 1970, coinciding with declining SSB
- Current fishing mortality is nearly double that producing MSY

2009 Management Recommendations (continued)

Therefore, the ESC recommends that the Extended Commission:

- Effect a meaningful reduction in catch below the current TAC of 11,810 t
- Take steps to ensure accurate future catch and effort reporting, given that the MP intended for adoption in 2010 will likely require catch and effort data as inputs

Management Procedure Development

Management Procedure Development

- The ESC supported the development of MPs based on fishery-independent indicators to be used for management advice in the short to medium term
- However, it recognized that the development of such class of MPs would take longer than a year, given complications involved in the use of tagging data
- The ESC considered that in order to complete MP development in one year (by 2010), the type of MPs would have to be restricted to those that only use CPUE, age-composition and/or aerial survey data

Management Procedure Development

The ESC strongly encourages the Extended Commission to engage with the MP development process.

Specifically, the ESC requested guidance from the Extended Commission on several items:

- **Frequency of TAC changes** – the ESC recommends evaluation of MPs that include changes every one, two, and three years
- **Maximum/minimum change in a future TAC** allowed from year to year once the MP is in place (both up and down)
- **Time lag for implementation of TACs** dictated by the MP – in the past a two year time lag was allowed between year of TAC computation and the year it was applied

Review of the 2010 Work Schedule

ESC Workplan for 2010

The proposed workplan from the ESC has the following elements:

- Continuation of tag recovery efforts, including freezer vessels
- Provision of urgent CPUE inputs and development of monitoring for CPUE quality
- Development and testing of MPs to recommend an MP at ESC15, including a small technical meeting in May/June 2010
- Holding an ESC meeting with the principal agenda item to test alternative MPs and select an MP to recommend to the Extended Commission

2009 -10 Proposed Workplan

Activity	Approximate Period	Resources or approximate budgetary implications[1]
Continuation of tag recovery efforts.	Tag recovery is continuous.	$64,000 for tag recovery as per draft budget in Attachment C of CCSBT-ESC/0909/05.
Provide SBT Stock Status repost to the other tuna RFMOs.	Sep – Nov 2009	N/A
CPUE Data inputs to be provided by Members	31 Oct 2009	N/A
Scientific Data Exchange	Apr – Jul 2010	N/A
Further development of consistency measures for the CPUE series. See **Attachment 6** for further details.	Nov 2009 – May/Jun 2010	Intersessional work be Member scientists, particularly in Japan. Meeting in conjunction with MP meeting held in May/Jun 2010. 6 panel days & associated costs.

[1] These preliminary estimates will be refined in the proposed budget for 2010 that the Secretariat will submit to the Extended Commission

2009 -10 Proposed Workplan
(continued)

Activity	Approximate Period	Resources or approximate budgetary implications[1]
Further intersessional development of the MP (see **Attachment 13** for further details), including a web meeting.	Sep 2009 – Aug 2010 and a web meeting in Jan 2010	Work to be conducted by National scientists, MP coordinator (15 Days) and Consultant (15 days).
Intersessional MP meeting to review results of initial MP testing and possibly introduce a few further robustness trials.	A 5 day small technical meeting, probably held in Seattle, May/Jun 2010	A 5 day meeting to be held with: 1 interpreter; no Secretariat; 10 panel days (AP, JI), 5 consultant days (TB), plus associated expenses. An extra 3 days will be required for development and coordination.
Extended Scientific Committee for the 25th meeting of the Scientific Committee meeting	7 days, Sep 4 – 10, 2010 Taipei	ESC Chair, full panel including consultant, full interpretation and Secretariat involvement.

[1] These preliminary estimates will be refined in the proposed budget for 2010 that the Secretariat will submit to the Extended Commission

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