CATCH QUOTAS FOR THE PACIFIC HAKE FISHERY IN THE GULF OF CALIFORNIA

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INDIVIDUAL VESSEL QUOTAS offers advantages for fishery management, BUT it requires abundant high-quality information regarding the resource and the fleet.

Is it possible to define IVQ when information is scarce?

Pacific Hake fishery in the northern Gulf of California:

- Currently under development
- Requires management actions to maintain the resource in a manner that contributes to a stable income for fishers.

HOW MUCH CATCH IS NEEDED FOR A PROFITABLE HAKE FISHERY?

WHICH IS THE TOTAL ALLOWABLE CATCH (TAC)?

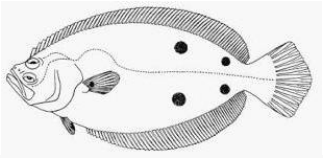
WHICH IS THE NUMBER OF VESSELS TO ACHIEVE TAC?

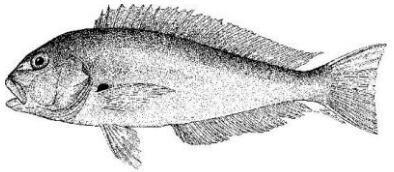
SHRIMP-PACIFIC HAKE-FINFISH FLEET

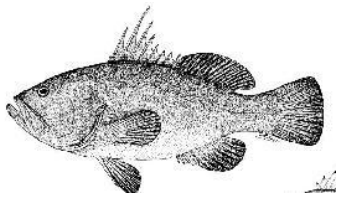
Shrimp: October to December

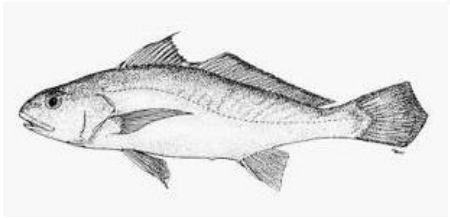
Pacific hake: February and March

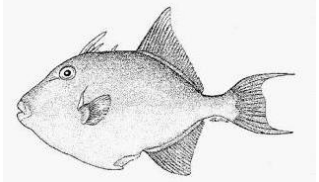
Finfish: April to June

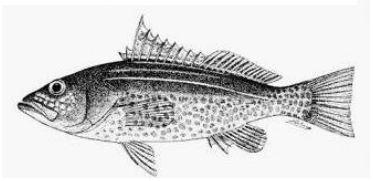












Representative Production Units (RPU)

Panels of producers from actual firms that are similar in terms of infrastructure, production scale and operation modality.

PANELLISTS AGREED ON:

- ✓ **prices of supplies**
- ✓ **operation costs**
- ✓ **landed catch value**
- ✓ **product sales price**

COST-BENEFIT ANALYSES

Total annual income

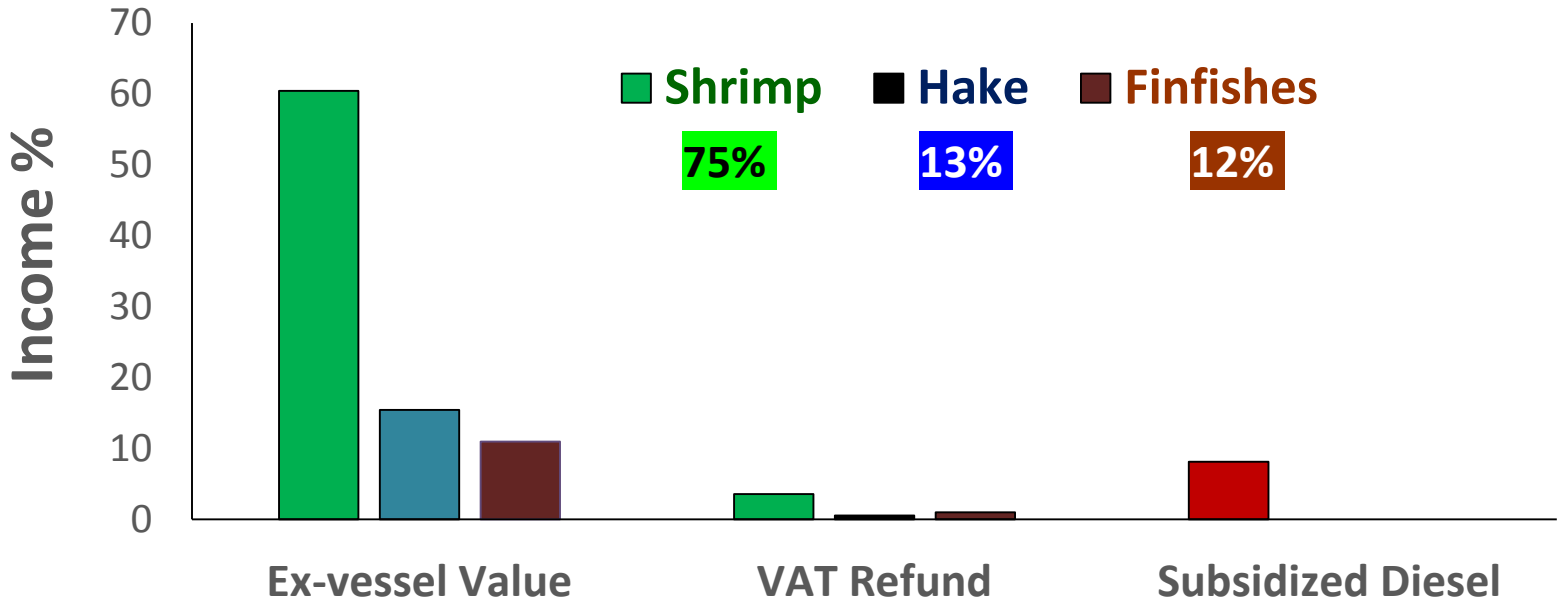
TI = VLC + DS + RVAT

Value of landed catch + **Diesel Subsidy** + **Refund of provisional VAT payments**

AVERAGE 2013 PRICES

Mex$

Percent distribution of RPU income by type of fishery



TOTAL INCOME = Mex$ 6,208,770

Product sales 86%

Diesel subsidy 8%

VAT refund 6%

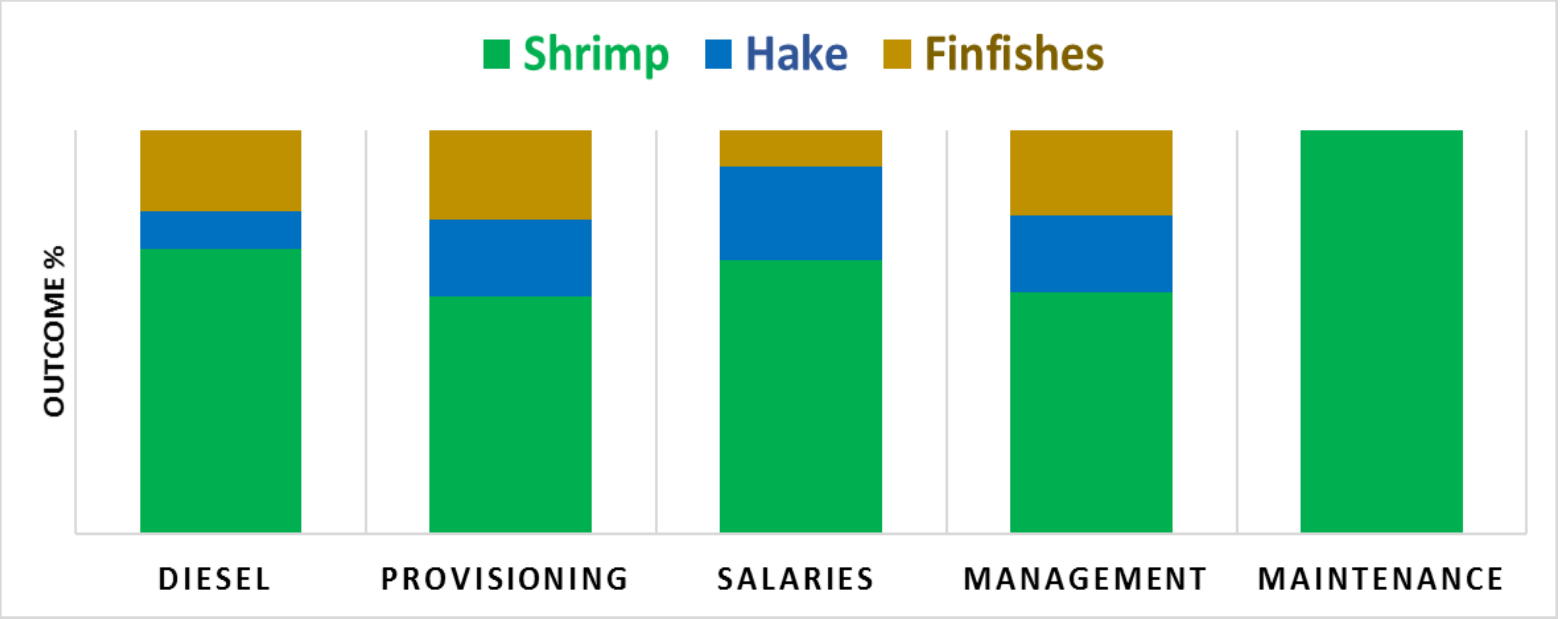
Annual operating cost (TC)

$$TC = A_i + SA_i + M_i + R_i + D_i$$

A_i	=	Management costs
SA_i	=	wages for fishers and administrative staff, including owner
M_i	=	Maintenance of vessels and fishing gear
R_i	=	Materials acquisition
D_i	=	Diesel purchases

i=1 shrimp, i=2 hake, i=3 finfishes

Percent distribution of RPU outcome by type of fishery



Total operation cost = Mex$5,902,297

Shrimp 70 %

Hake 14 %

Finfish 16 %

ECONOMIC PERFORMANCE INDICATORS

NET CASH AT THE END OF YEAR = TI - TC

TI Total Annual Income

TC Total Annual Operating Cost

BENEFIT/COST

(TI/TC)

PROFITABILITY = NCa/ TC * 100

NCa Net Cash at the end of the year

ECONOMIC PERFORMANCE INDICATORS

NET CASH AT THE END OF 2013

Mex$ 306.482

BENEFIT/COST

1.05

PROFITABILITY

5.2%

How much is a good net cash at the end of the year?

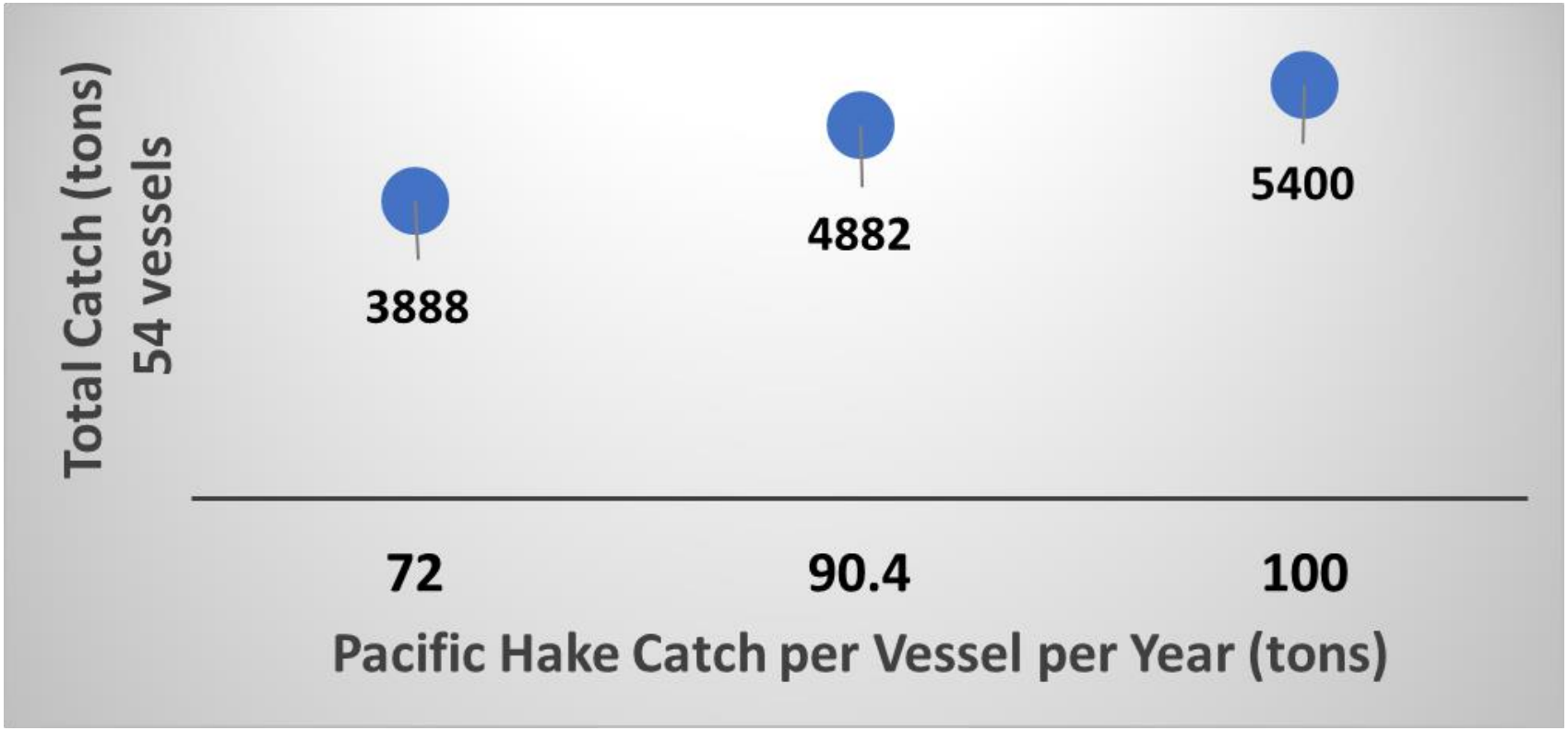
30% increase in the RPU's net income

To increase net income by 30% by modifying Hake catches only, it would have to increase from

72 t to 90.4 t.

100 t represents a **45%** increase in net income

HOW MUCH TOTAL HAKE CATCH (TAC) IS NEEDED FOR A PROFITABLE AND SUSTAINABLE PACIFIC HAKE FISHERY



WHICH IS THE TOTAL ALLOWABLE CATCH (TAC)?

$$TAC = MSY = 0.37 * M * B$$ *

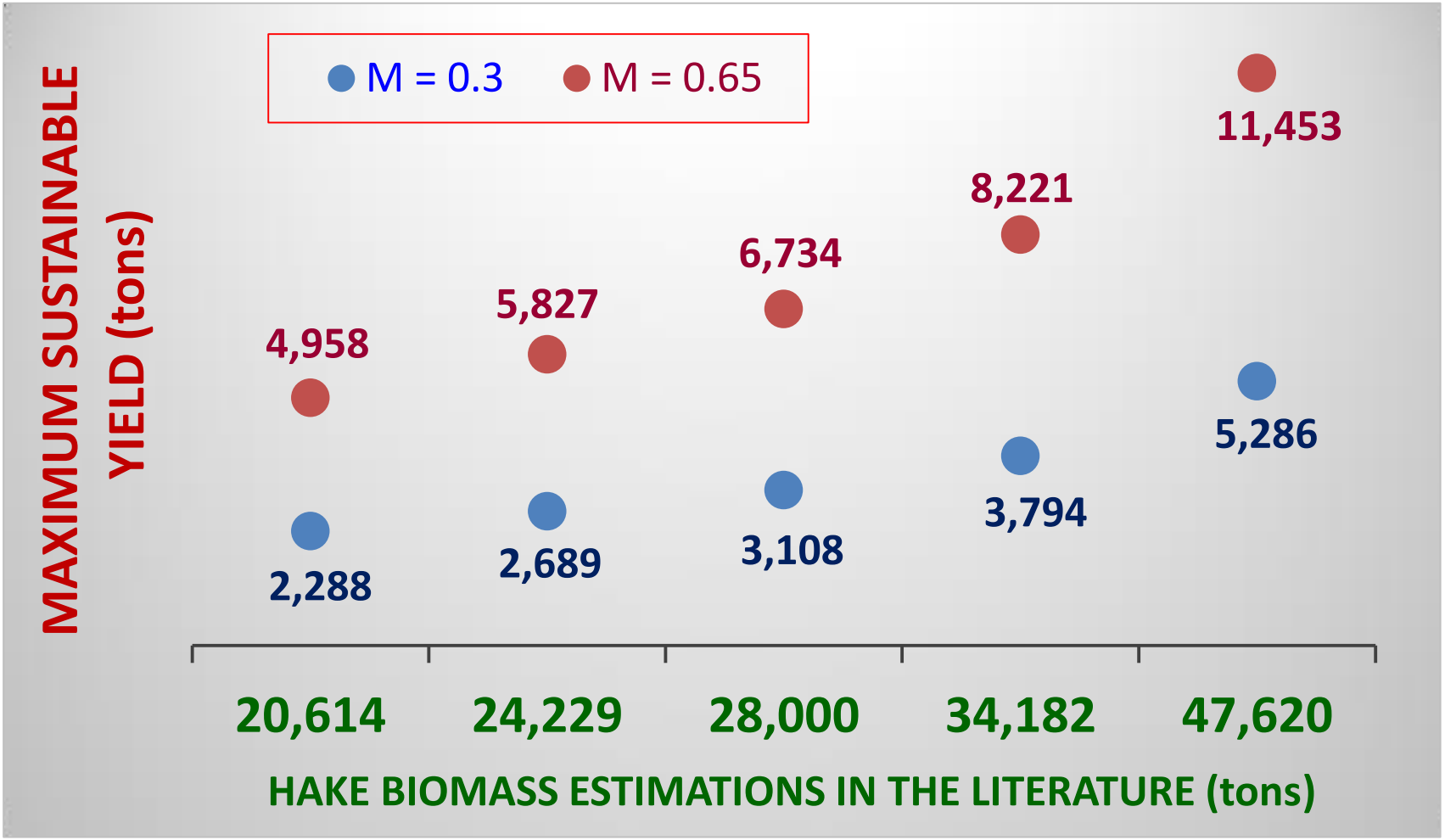
B = AVAILABLE ESTIMATES OF HAKE BIOMASS

M = NATURAL MORTALITY
(0.3 and 0.65) **

* Sparre, P. and S. C. Venema. 1995. FAO Documento Técnico Pesca 306/1

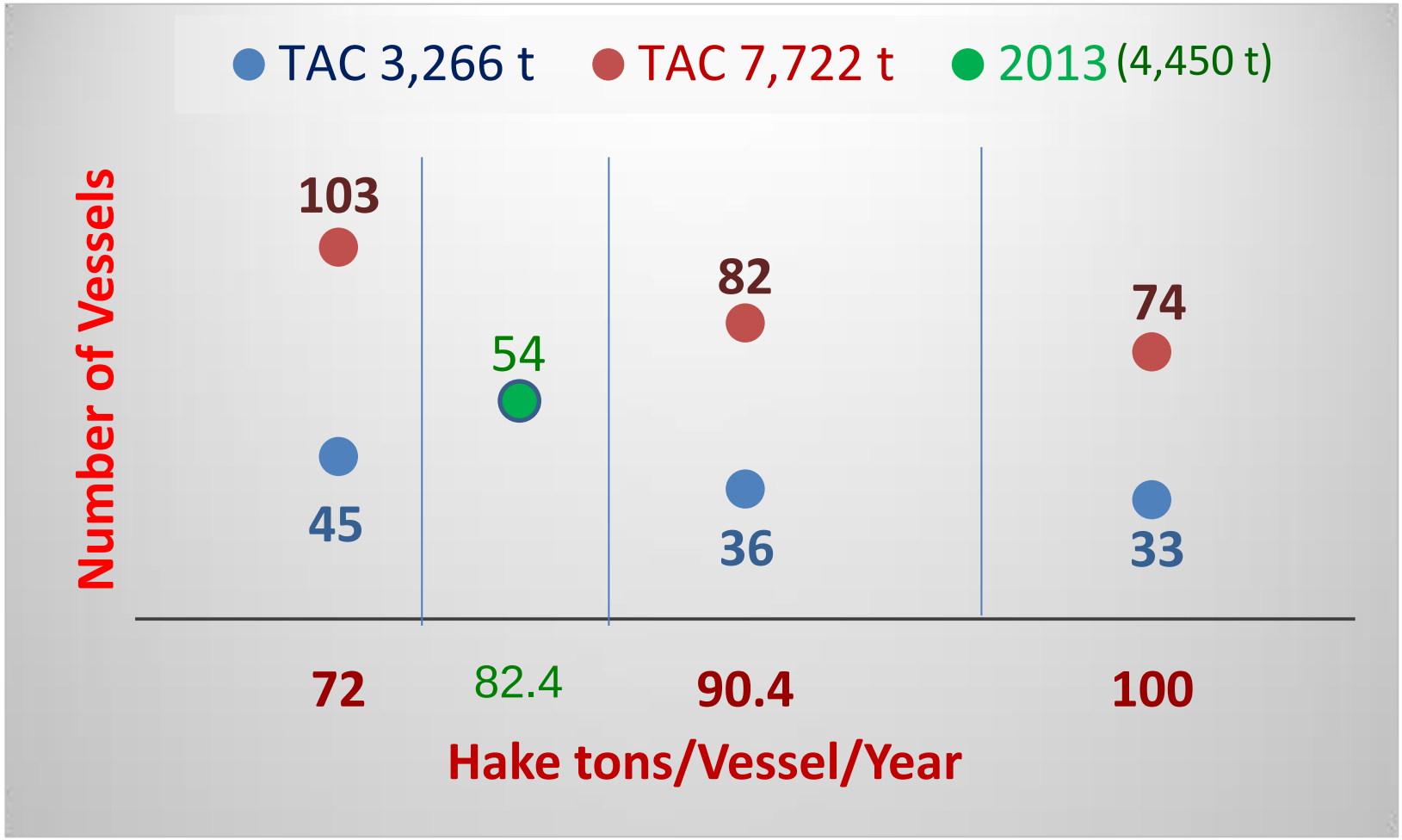
** Bayley, K. M., R. C. Francis and P. R. Stevens. 1982. CalCOFI Reports 23

MAXIMUM SUSTAINABLE YIELDS FOR DIFFERENT AVAILABLE BIOMASS ESTIMATES AND NATURAL MORTALITY VALUES



Number of Vessels necessary to achieve TAC

NV = TAC / optimal harvest level



Representative **P**roduction **U**nit

- The RPU analyzed is multi-fisheries: shrimp, Pacific hake and finfishes.

- This work only considered the change in hake catch, keeping everything else constant.

- Maximum Sustainable Yield approximations are highly uncertain

- IVQ figures result from improving profits by increasing catches only.

RAMÍREZ-RODRÍGUEZ M. **2017**.

A profitability analysis of catch quotas for the Pacific Hake fishery in the Gulf of California.

North American Journal of Fisheries Management 37: 29-39.

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