Stock Assessment

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Recruitment

Growth

Immigration

Population dynamics

Mortality

Catch
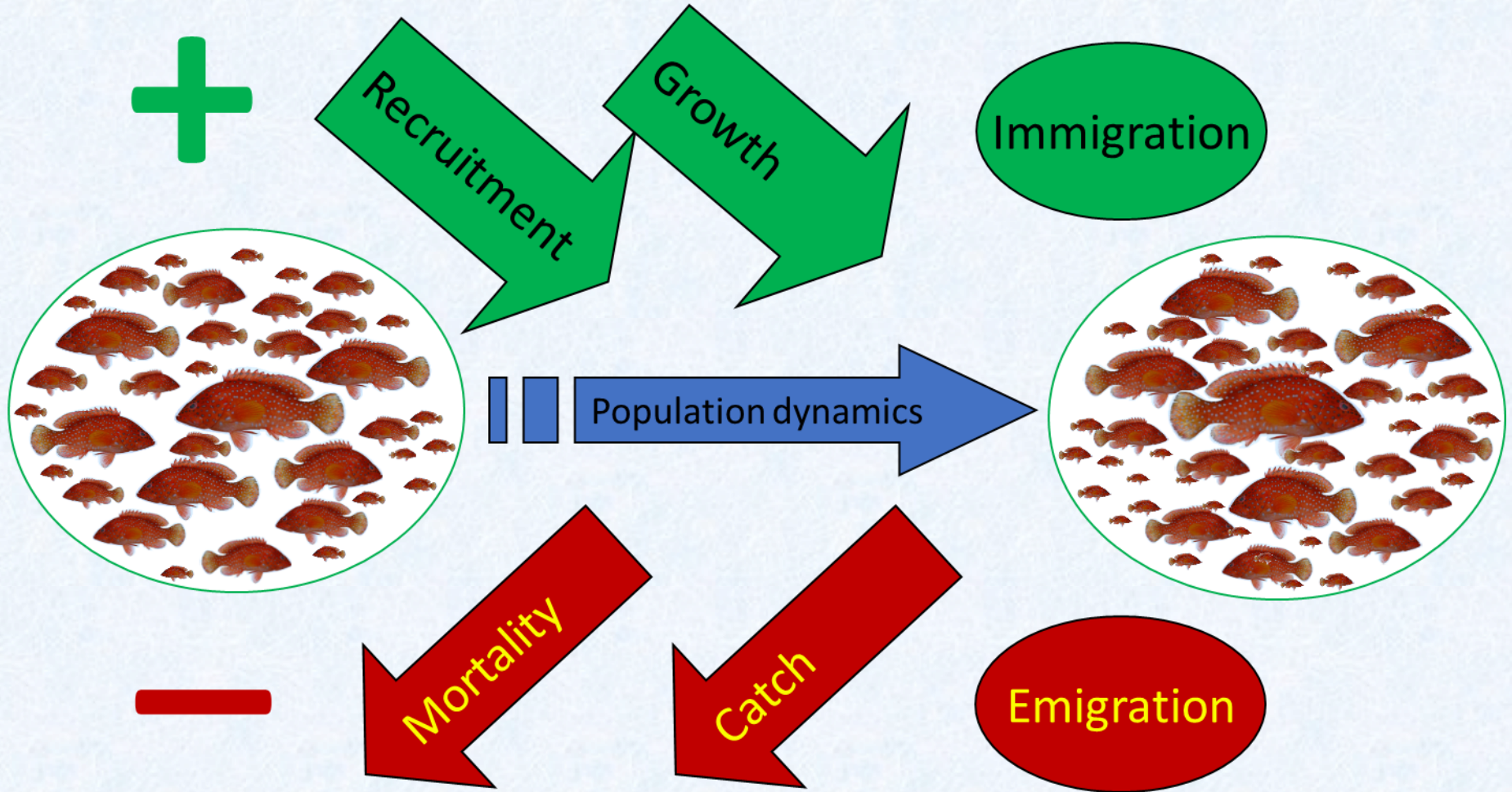
Emigration

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IRG – Indigenous Capacity Building, FRDC Project 2017/069

What you will learn

- What is a stock assessment
- Types of assessments
- Assumptions made for each type of assessment
- Catch rate standardisation
- Tuning models, scenarios and sensitivities
- Spawning biomass estimates (relative vs absolute),
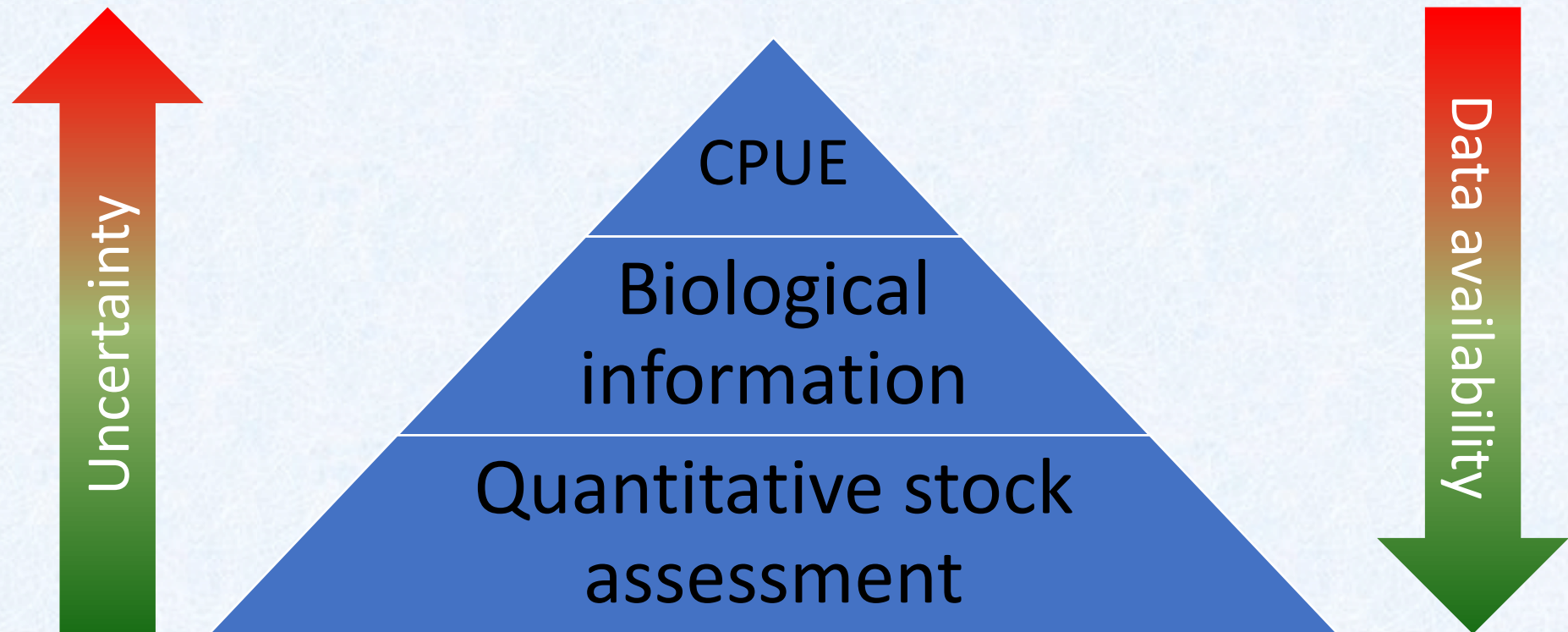- Projections and uncertainty

Why do an assessment?

We want to know:

- How many fish are out there? (Abundance, biomass)

- How much can we catch SUSTAINABLY?

- How do we work this out? DATA!

Types of stock assessment

- Data drives assessment type

Uncertainty ↑

Data availability ↓

CPUE

Biological information

Quantitative stock assessment

Catch as index of abundance?

Catch

Does this tell us the stock size?

Year

Most basic data:

- *CATCH* (*C*)
- What have been the catches over time?

Catch as an index of abundance?
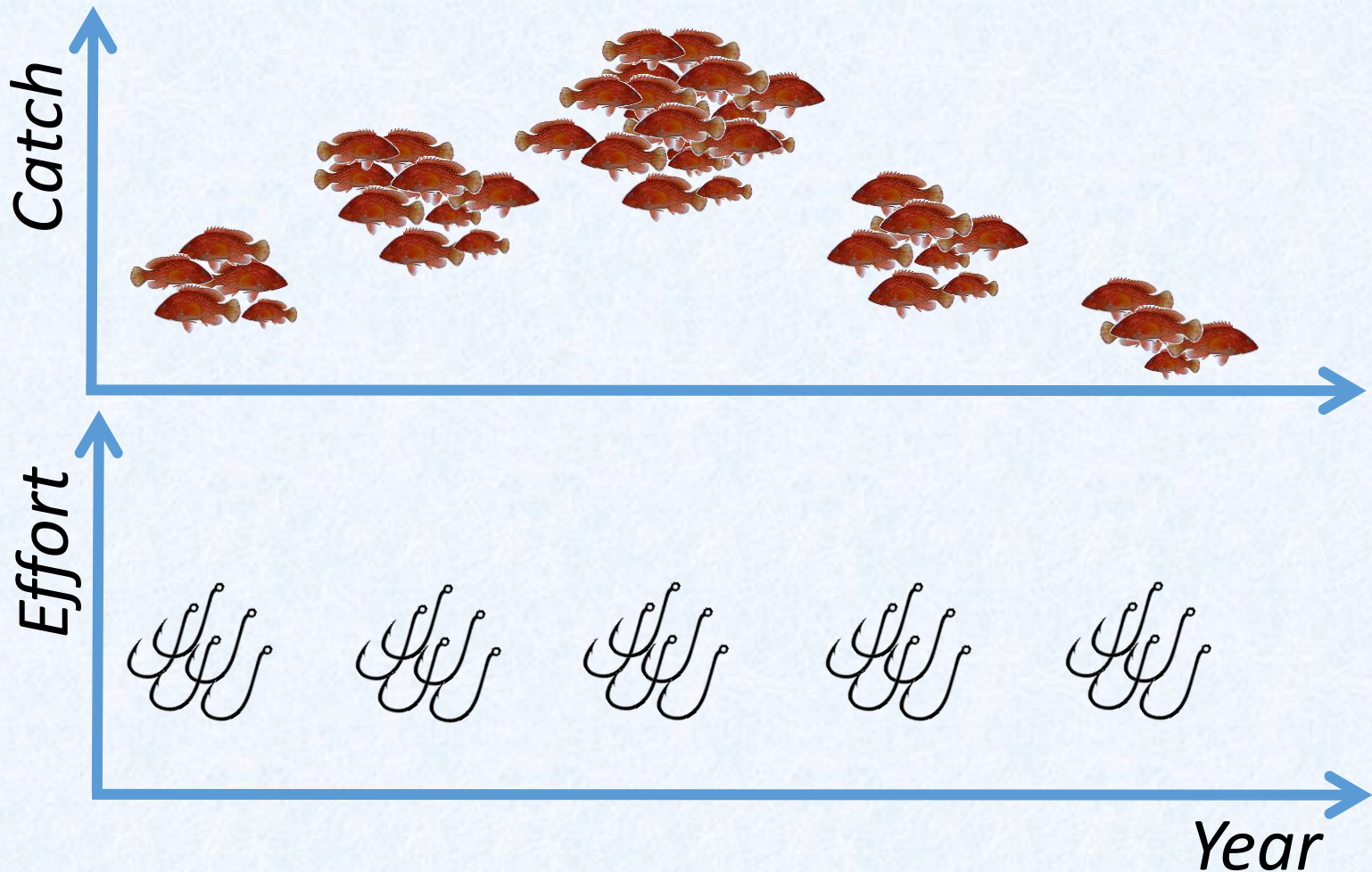
Catch

Does this tell us the stock size?

Year

That depends…..

- How much fishing occurred each year?

- Were the same fishing gears used each year?
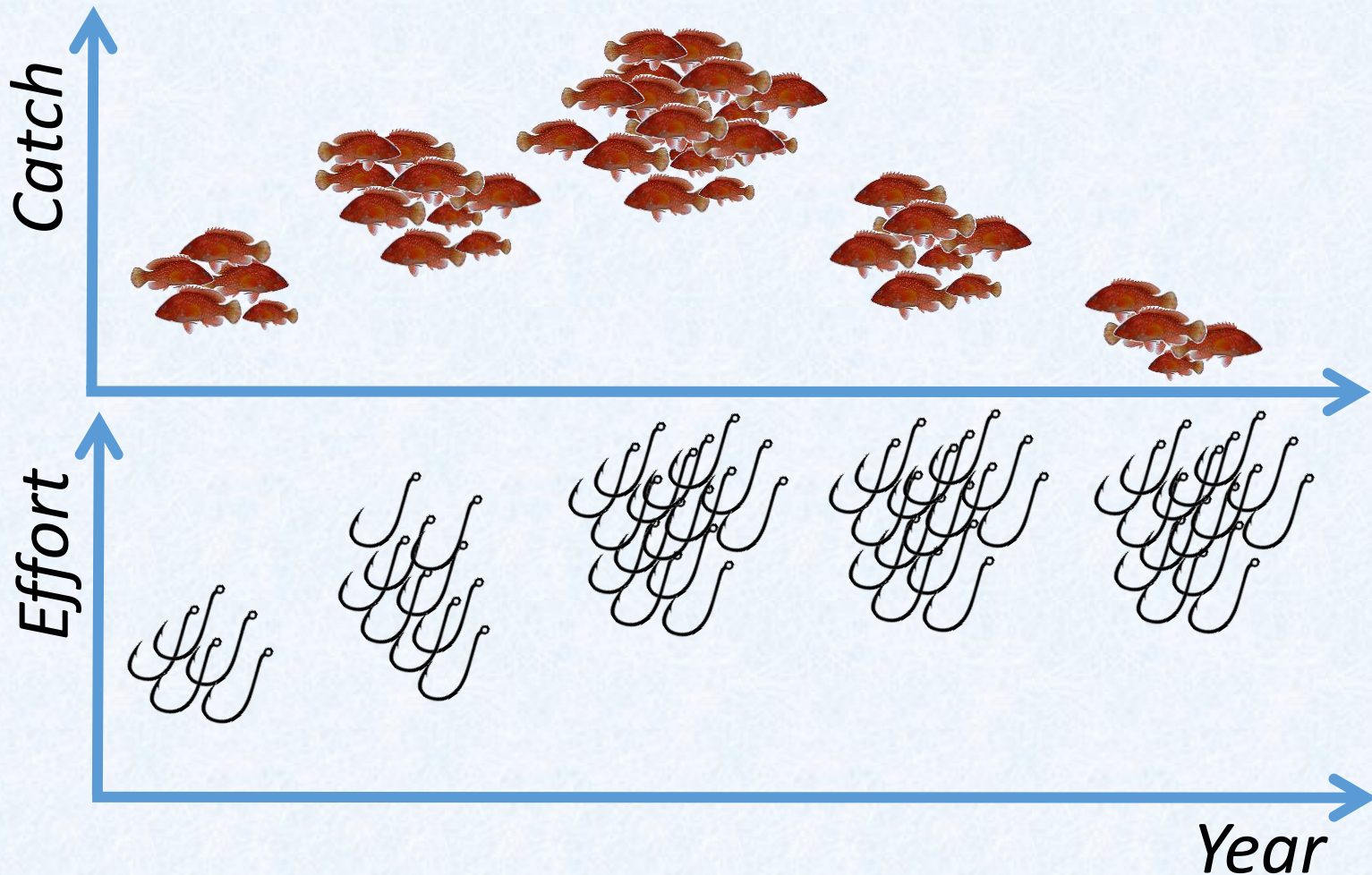
- Where did the fishing occur?

Need more information on fishing EFFORT (E)

Catch as an index of abundance?

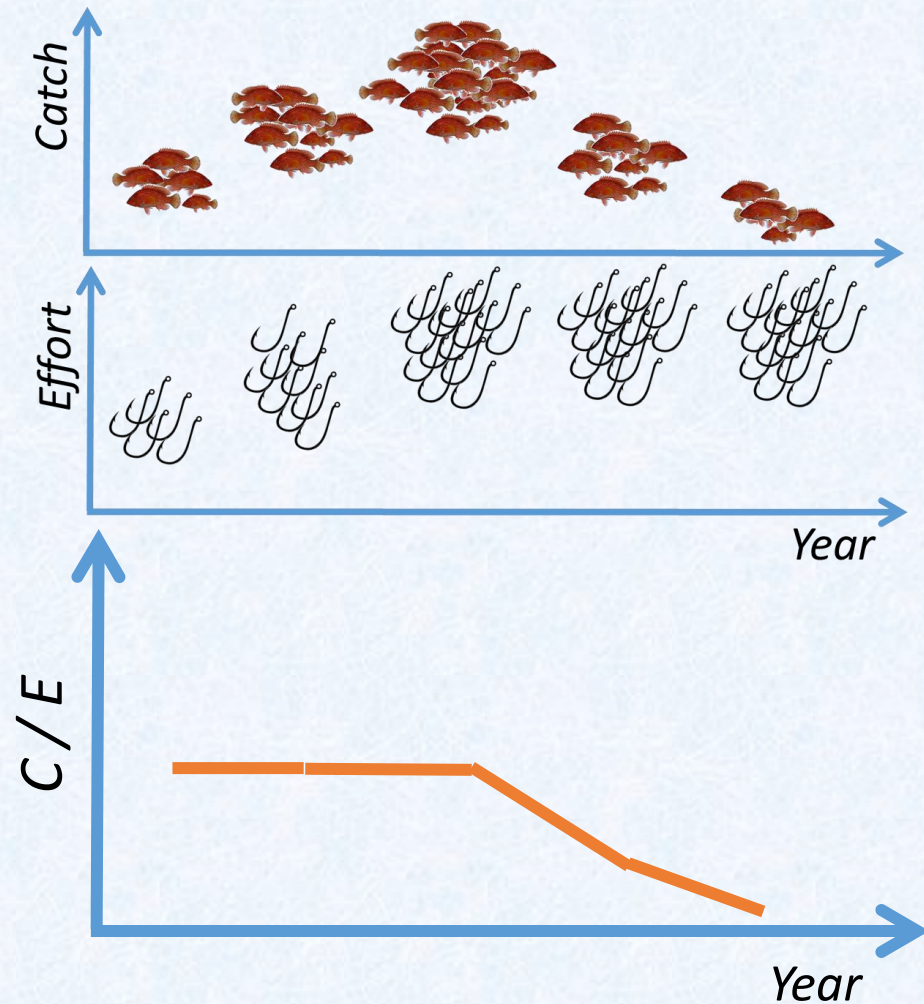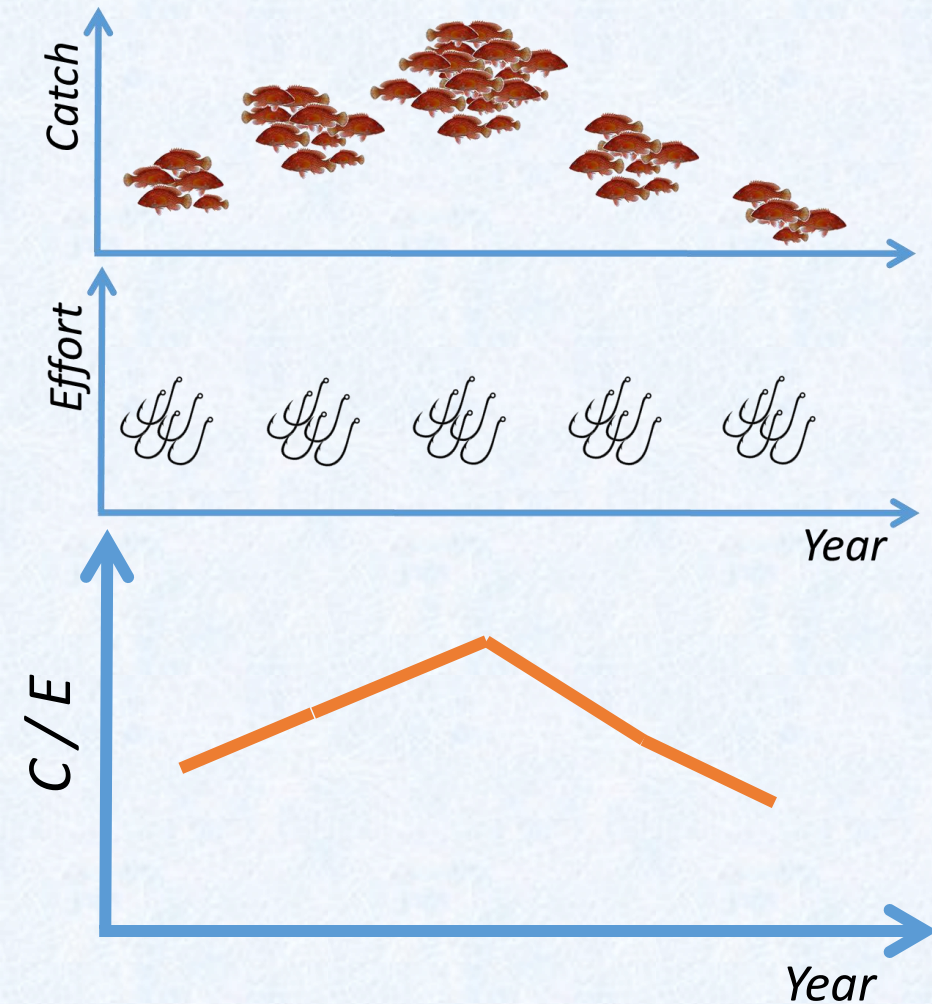Yes – but only if fishing effort has not changed!

Catch as an index of abundance?

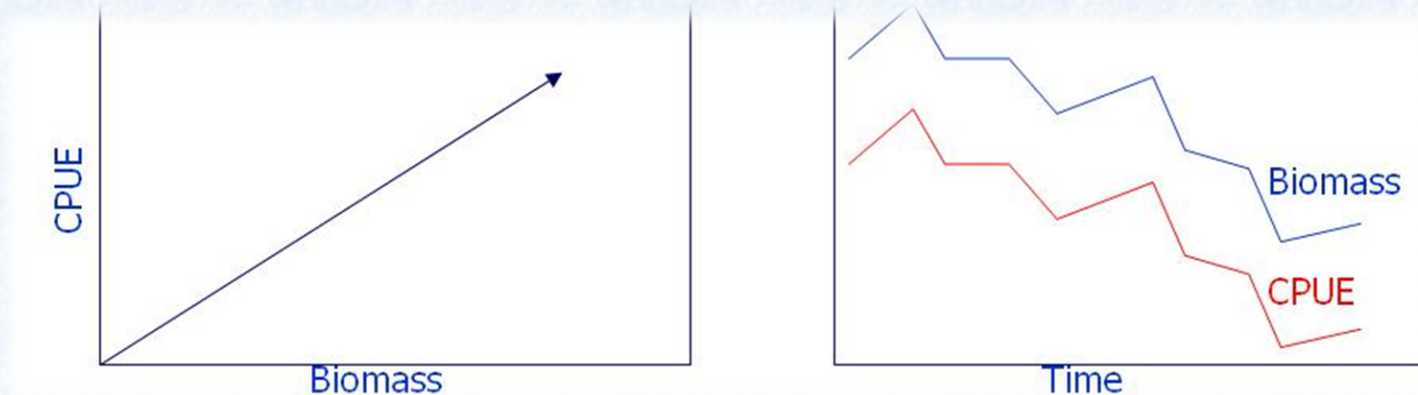NO – if the fishing effort has changed over time

Catch as an index of abundance?

Catch per Unit Effort (CPUE) is much better

CPUE as an index of abundance

- Using CPUE as index of abundance assumes it is proportional to stock size

- Not always true

CPUE as an index of abundance

- Assumes that catch rate is proportionate to abundance

- Not always the case for a lot of reasons
  - Availability
  - Targeting
  - The environment
  - Time of day
  - Season
  - Gear – methods, technology
  - Fishermen – skill
  - Hyperstability

CPUE as an index of abundance

- Standardise catch rates
- Standardising CPUE is a modelling process that attempts to remove variation in CPUE over time due to factors other than abundance

CPUE as an index of abundance

Standardisation

- CPUE varies with boat, skipper, season, depth, area etc

- Standardise CPUE to take out this variation

- Important to accurately record:

  - Depth
  - Location
  - Species
  - Gear details

CPUE as an index of abundance

Fishery-independent survey

- Removes the issue of CPUE varying with boat, skipper, season, depth, area etc

- Provides an additional index of abundance to commercial CPUE

Catch per Unit Effort (CPUE)

- Provides a basic stock assessment
- For species with no reliable information on
  - Current biomass
  - Current exploitation rate
- Requires catch and effort data – CPUE
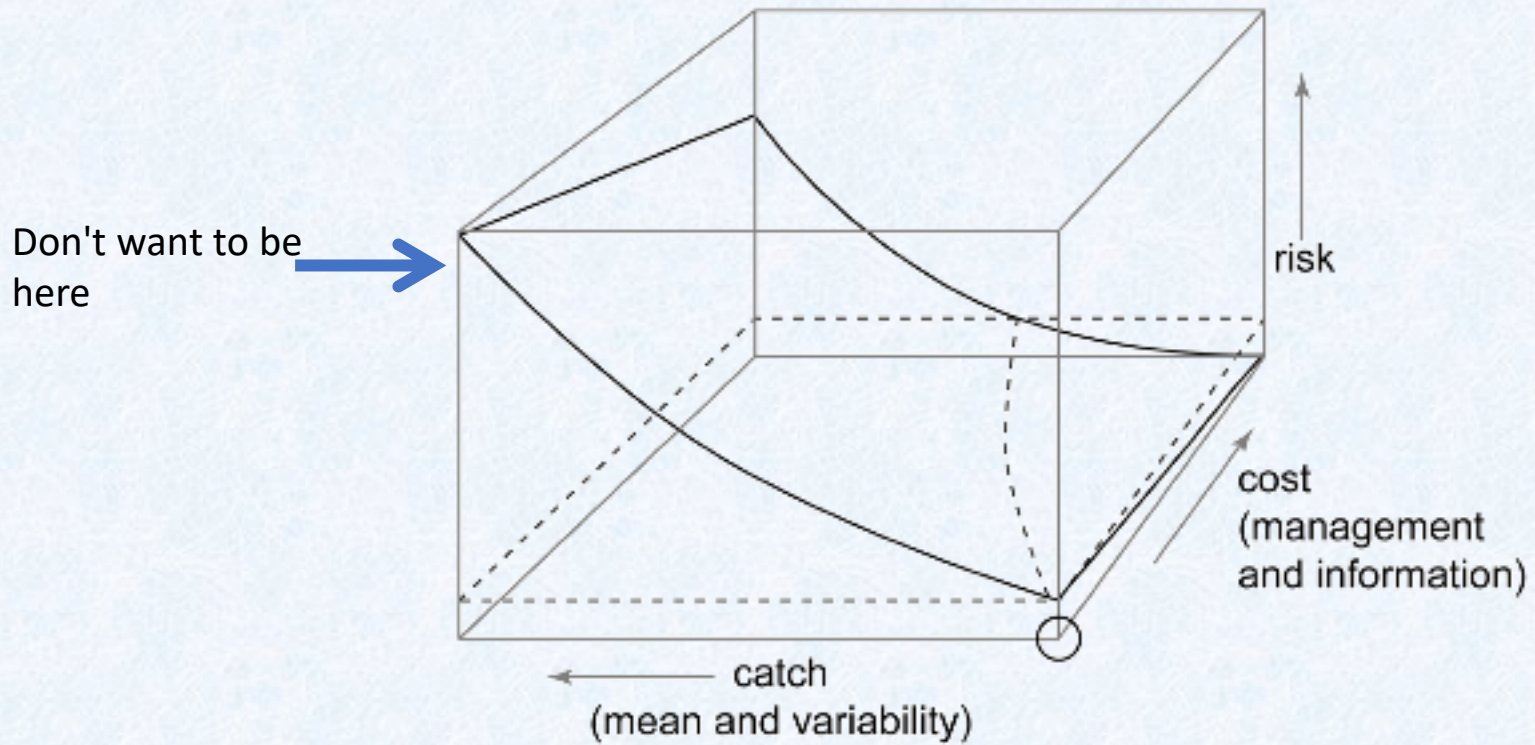- Assumes CPUE proportional to stock size

Types of assessment

- Data Rich
  - Robust quantitative assessment

- Data Poor
  - Catch Effort (logbooks)
  - CPUE analysis
  - Risk Assessment

Risk – Cost – Catch Framework

Don't want to be here →

risk

cost
(management
and information)

catch
(mean and variability)

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