Overview of The Sustainable Salmon Fisheries and Escapement Goal Policies

A Presentation to the Alaska Board of Fisheries
March 19, 2013

Robert A. Clark
Division of Sport Fish
and
Eric C. Volk
Division of Commercial Fisheries

RC 3
Tab 2

Objectives of Presentation

- Overview of the *Policy for the Management of Sustainable Salmon Fisheries* (SSFP) and the *Policy for Statewide Escapement Goals* (EGP)

- Should escapement goals be lowered, raised, or stay the same when productivity is declining?

- What are sustained escapement thresholds (SETs) and why not use them?

- Proposals 218 and 219

Major Tenets of the SSFP

- Maintain Salmon Stocks and Habitat
- Manage for Escapements
- Establish and Apply Effective Management
- Encourage Public Support and Involvement
- Manage Conservatively, Acknowledge Uncertainty

Manage for Escapements

- Definitions
  - Stock, escapement, run, return, yield
  - Sustained yield; maximum, and optimum sustained yield
  - Stock of concern

Manage for Escapements

- Types of Escapement Goals
  - Biological Escapement Goal (BEG)
  - Sustainable Escapement Goal (SEG)
  - Optimal Escapement Goal (OEG)
  - Sustained Escapement Threshold (SET)

Major Tenets of the EGP

- Department
  - Develops BEGs, SEGs, and if needed, SETs
- Board and Department
  - Jointly Develop OEGs and Inriver Run Goals

ADF&G Escapement Goal Development Process

Regional Escapement Goal Review Team

- Create work assignments
- Review regional/area escapement goals
- Draft stock escapement goal analyses
- Draft escapement goal report

ADF&G staff and public review

Approval of escapement goal recommendations by Regional Supervisors

Presentation of recommendations to Board of Fisheries;
Board may adopt OEGs or inriver run goals based on biological or allocative factors

Formal adoption by Division Directors

Uncertainty and Escapement Goals

- Escapement Goals Ranges Should Allow for Uncertainty In
  - Measurement Techniques
  - Variability in Assessments of Stock Size
  - Climate and Oceanographic Variability
  - Varying Abundance of Populations Within Stocks

Uncertainty and Escapement Goals

- Density Dependent Factors
  - Competition for Spawning Habitat
  - Competition for Rearing Habitat and/or Food
- Density Independent Factors
  - Climate and Oceanographic Variability
    - Freshwater Environment
    - Marine Environment

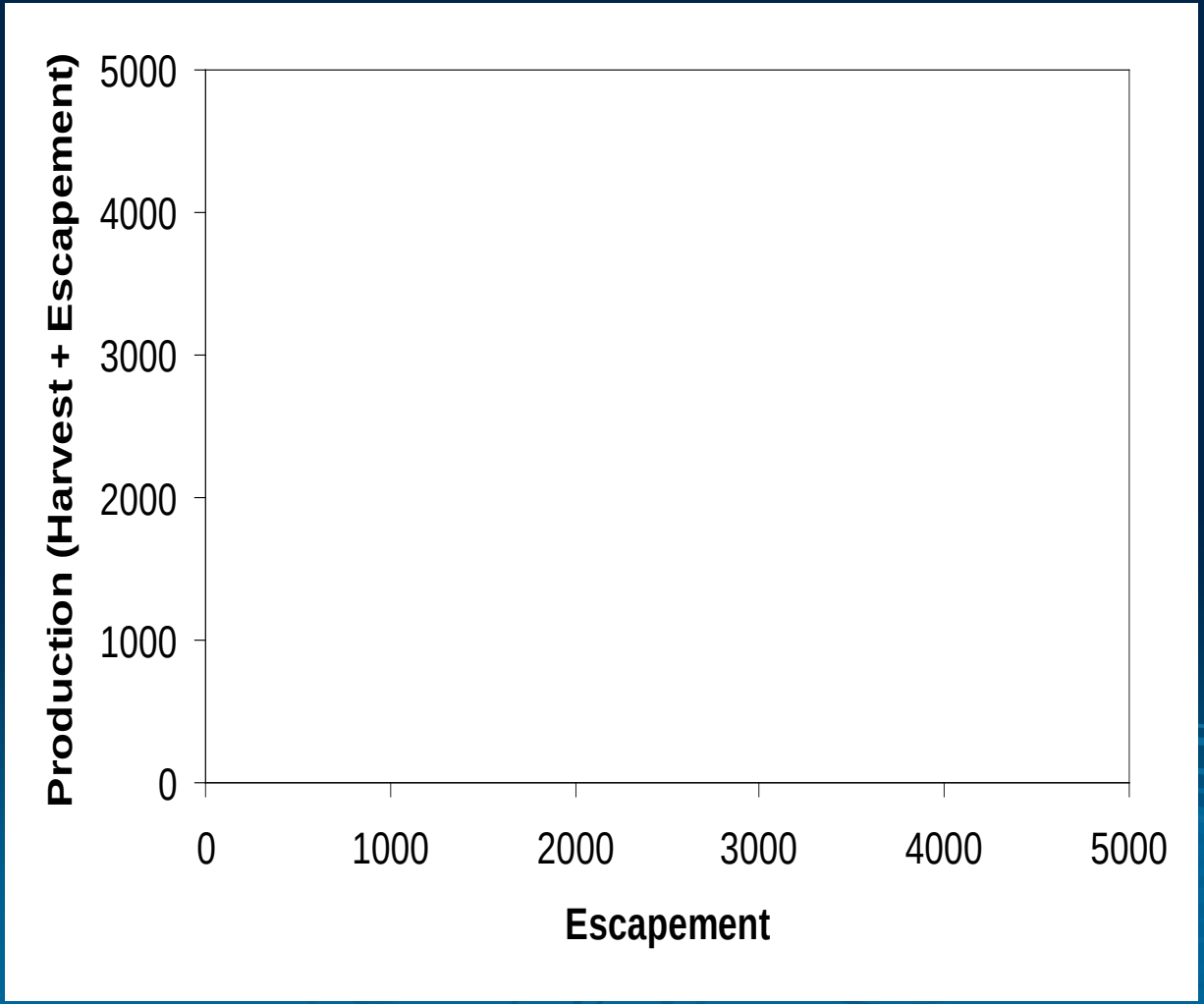
Uncertainty and Escapement Goals

- Density Independent Factors
  - Climate and Oceanographic Variability
    - A Simple Production Model
    - Escapement Goals as Productivity Declines
      - Productivity = production per unit spawner in the absence of competition
      - Should the goal go up, down, or stay the same?

Uncertainty and Escapement Goals

A Simple Production Model:

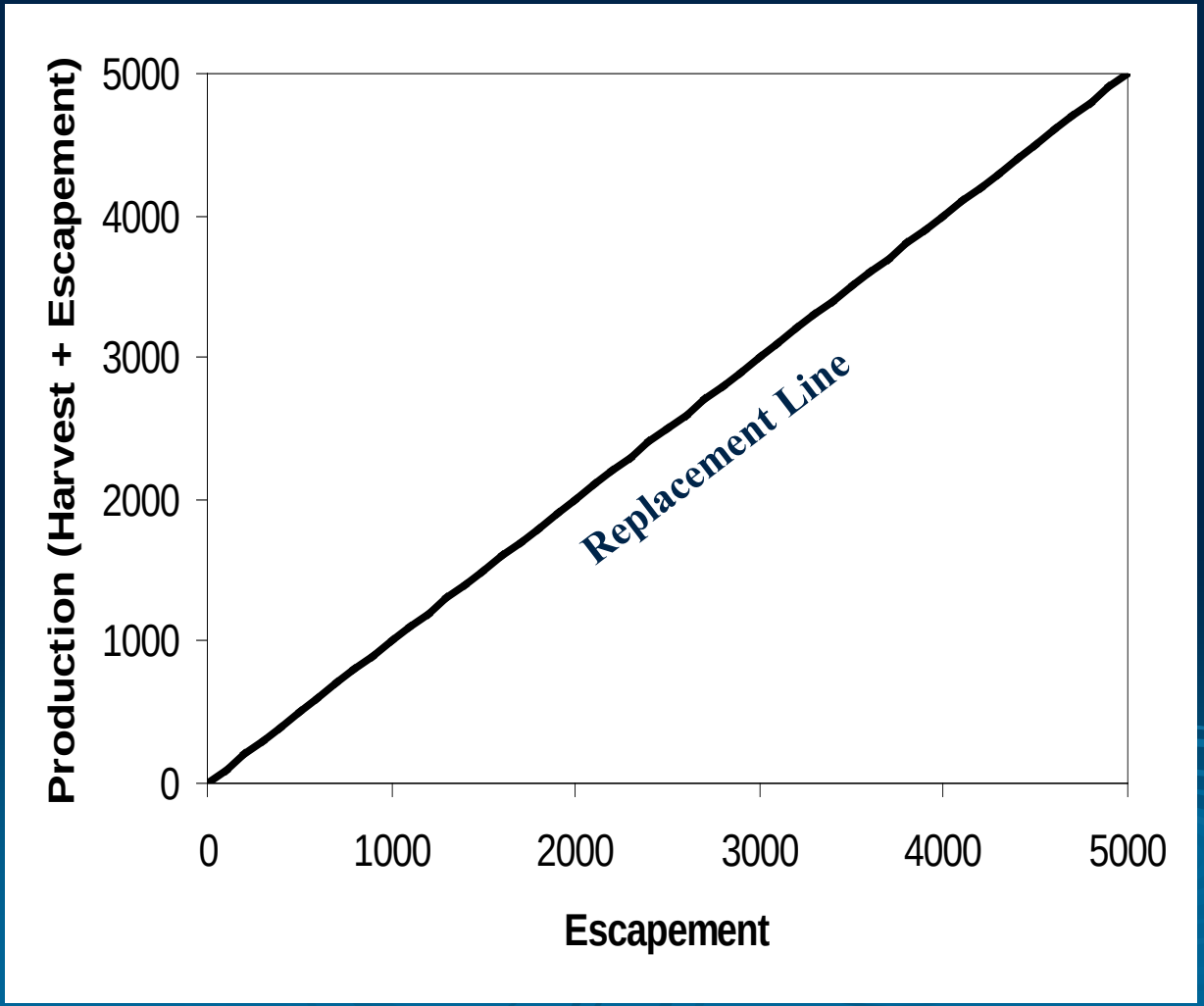
Escapement and the subsequent production can be plotted on a graph like this…



Uncertainty and Escapement Goals

A Simple Production Model:

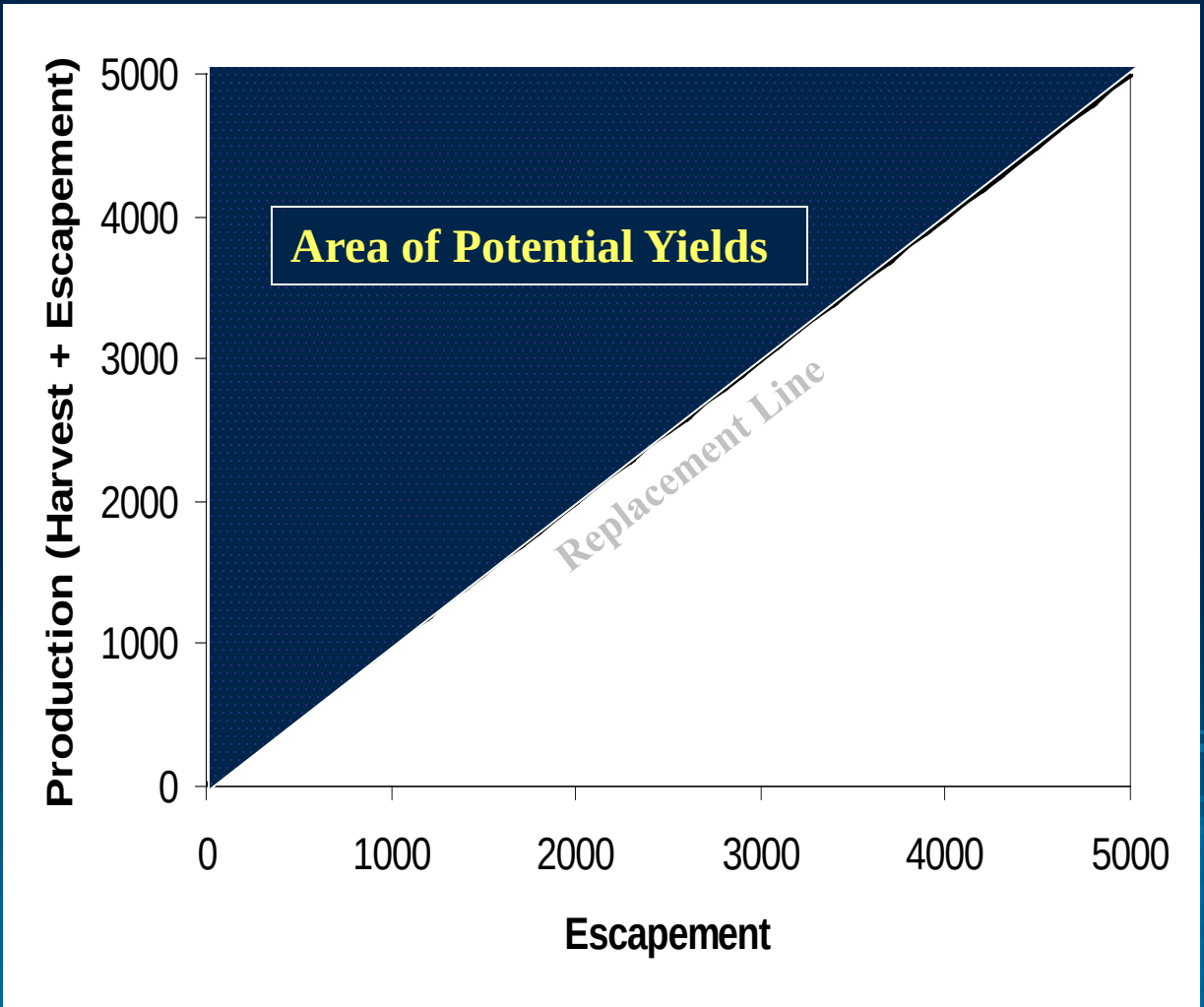
…with a **Replacement Line** where escapement = production (i.e., no yields).



Uncertainty and Escapement Goals

A Simple Production Model:

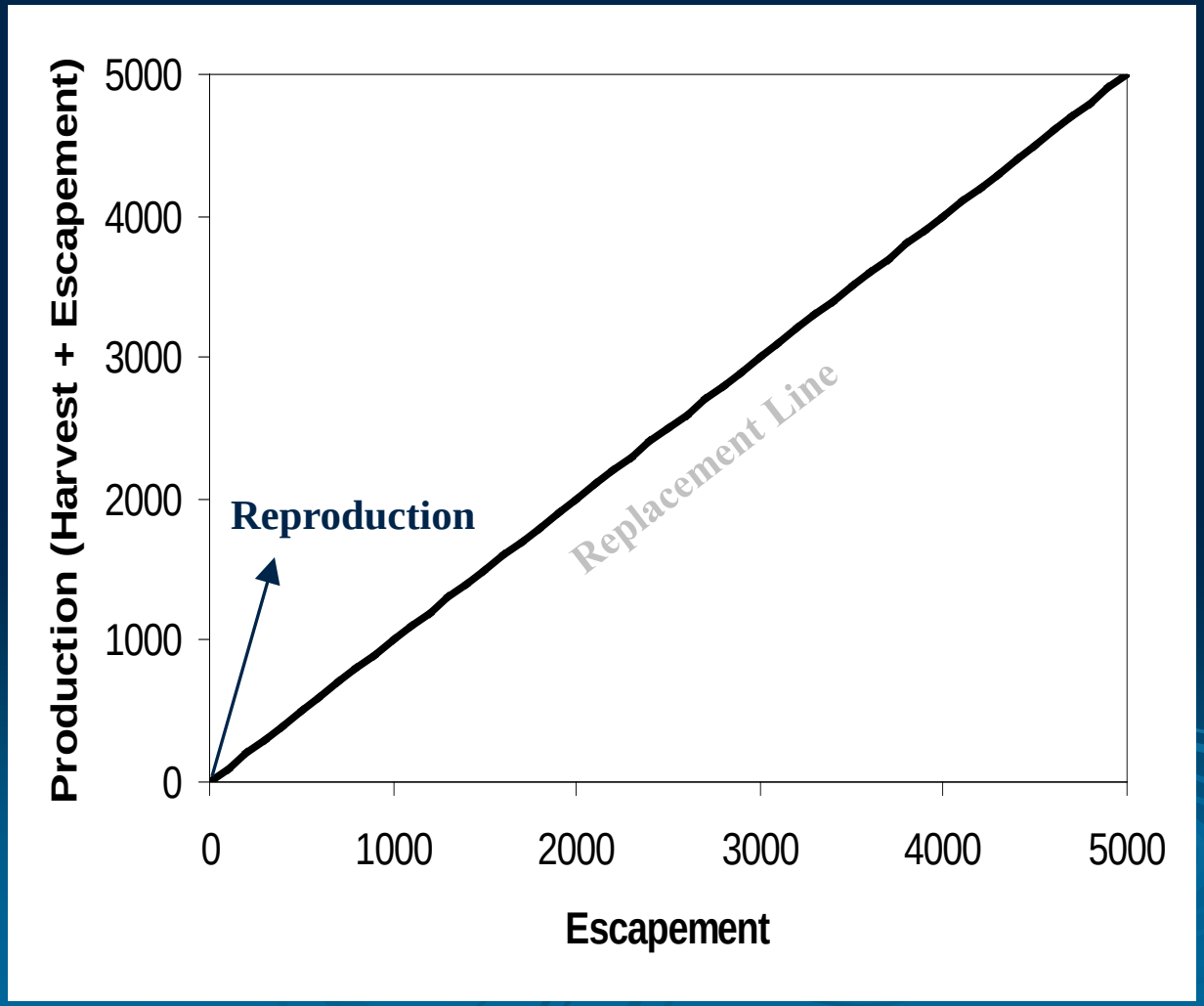
There is a potential for yields only when production is greater than escapement.



Uncertainty and Escapement Goals

A Simple Production Model:

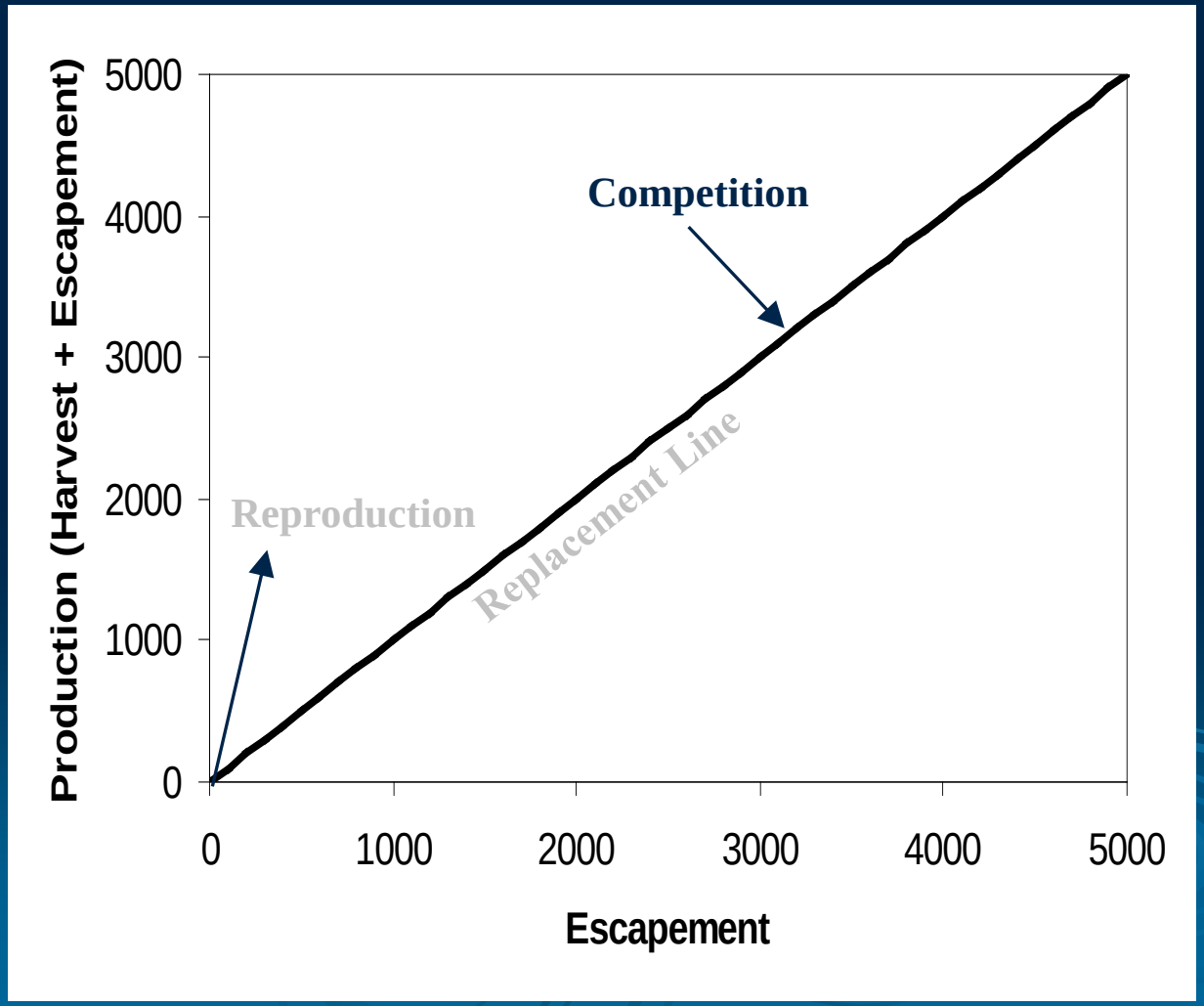
Potential yields can be realized because of the reproductive capacity of salmon, but…



Uncertainty and Escapement Goals

A Simple Production Model:

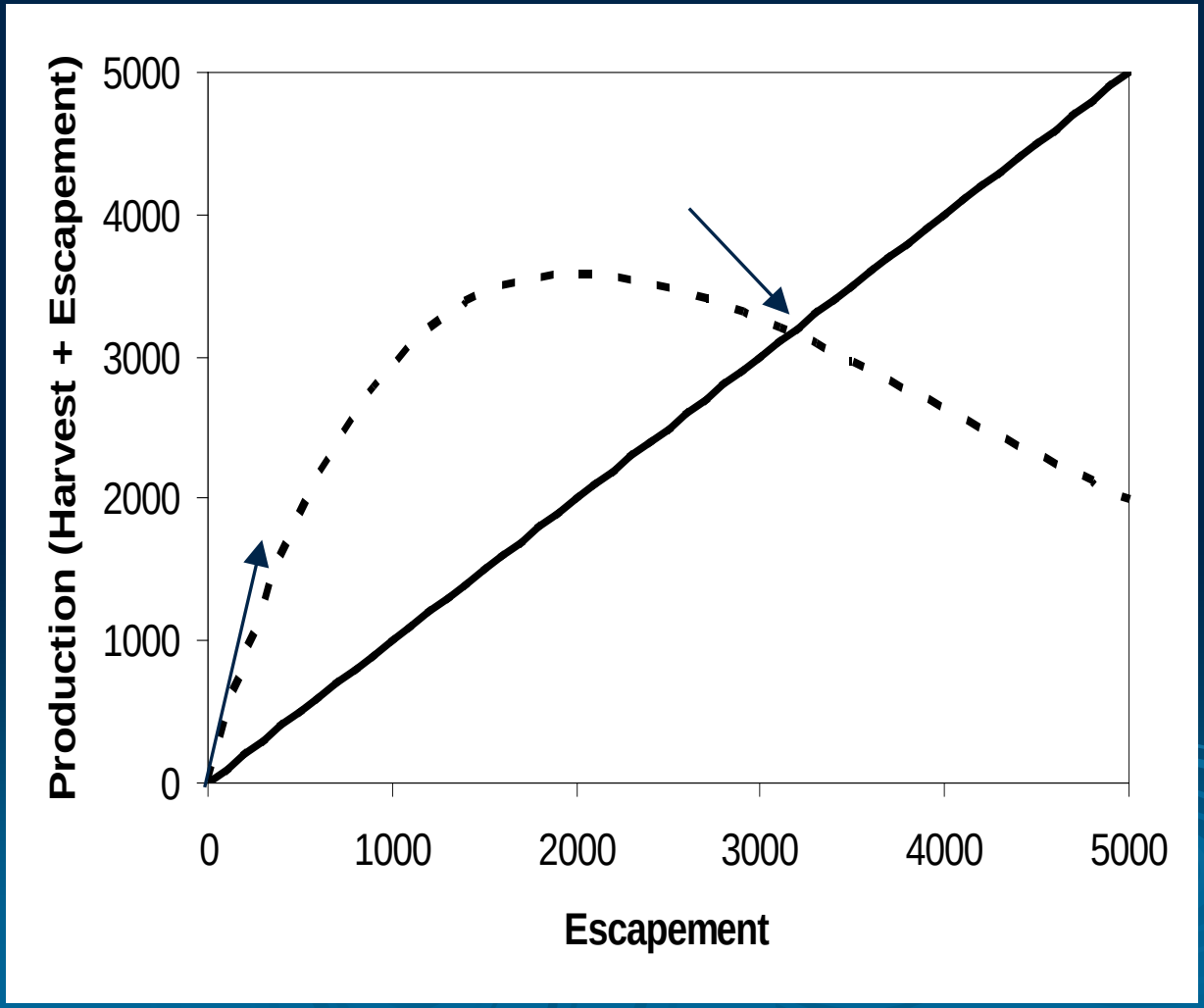
…as escapements are increased, competition increases, which limits potential yields.



Uncertainty and Escapement Goals

A Simple Production Model:

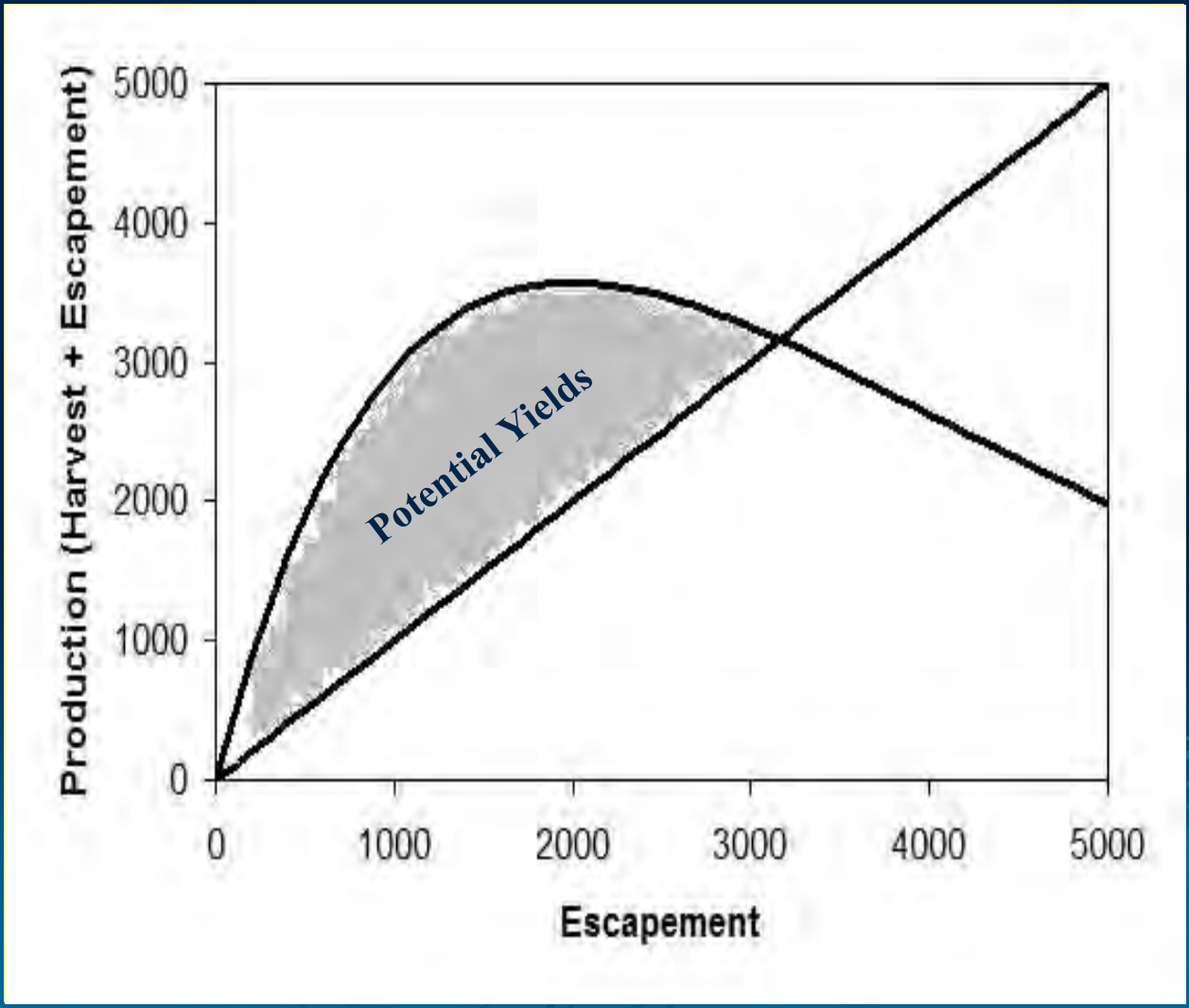
We can model the interaction of reproductive potential and competition using our data.



Uncertainty and Escapement Goals

A Simple Production Model:

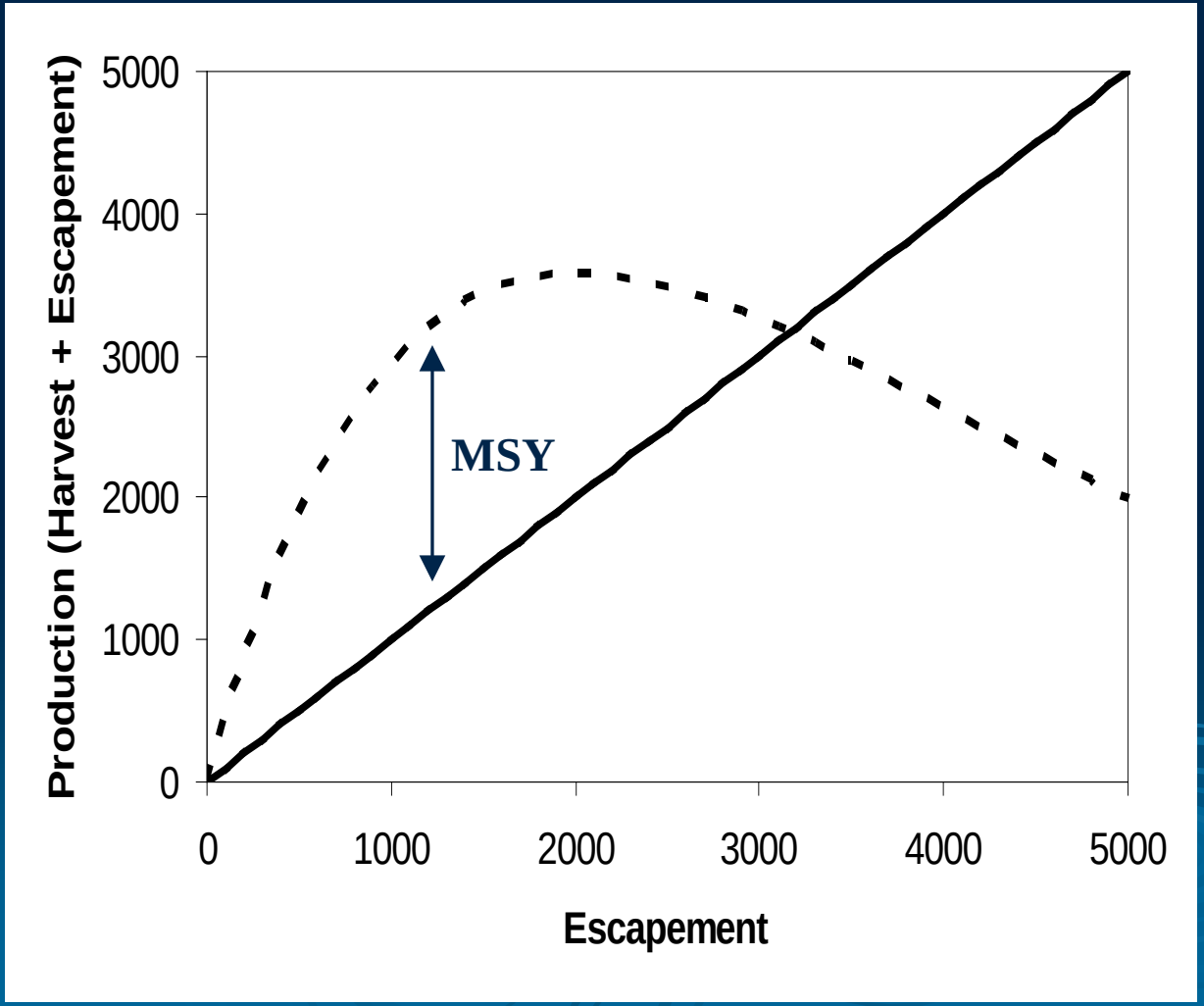
The model helps to define potential yields relative to escapements.



Uncertainty and Escapement Goals

A Simple Production Model :

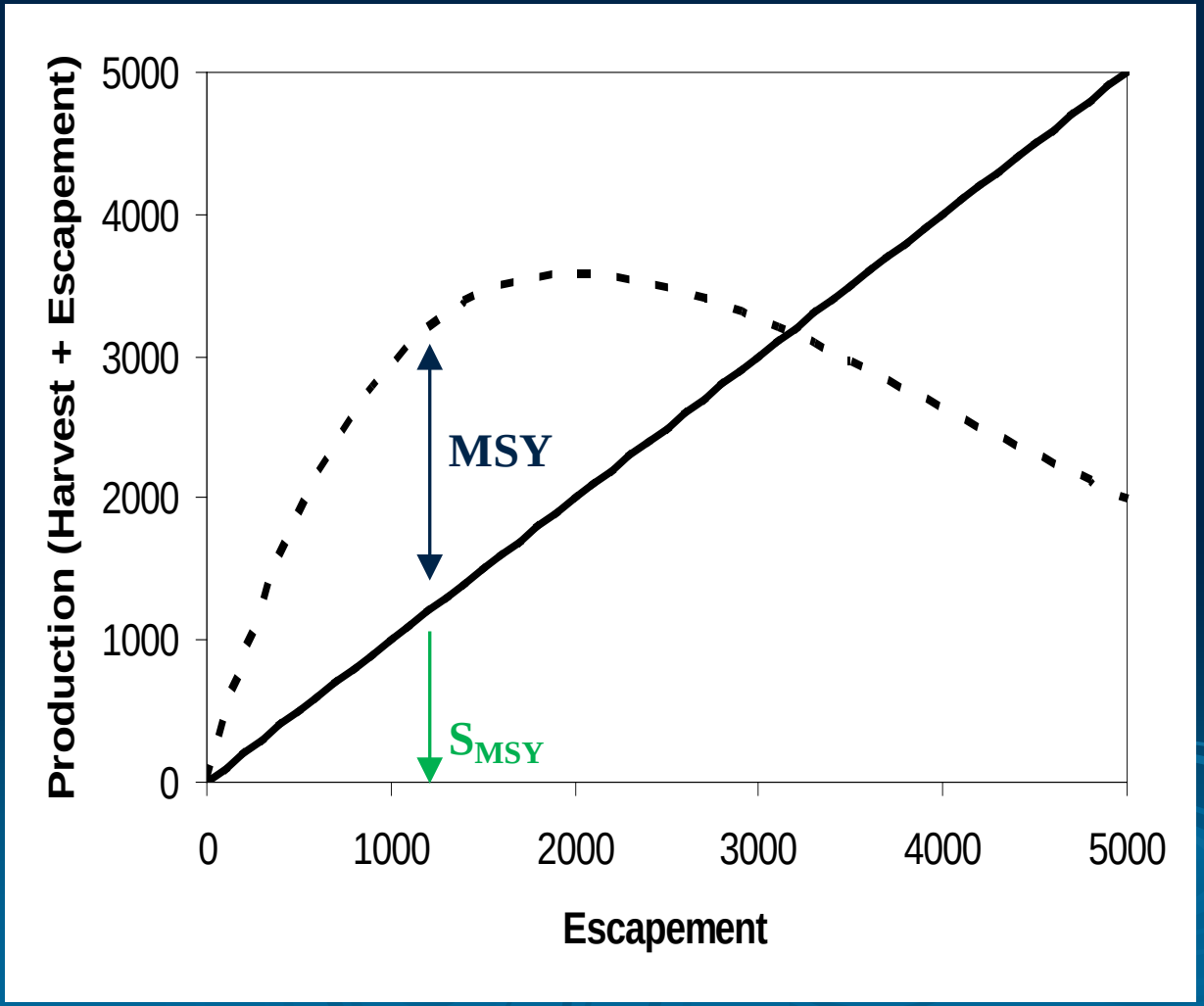
MSY is the maximum sustained yield based on the model…



Uncertainty and Escapement Goals

A Simple Production Model:

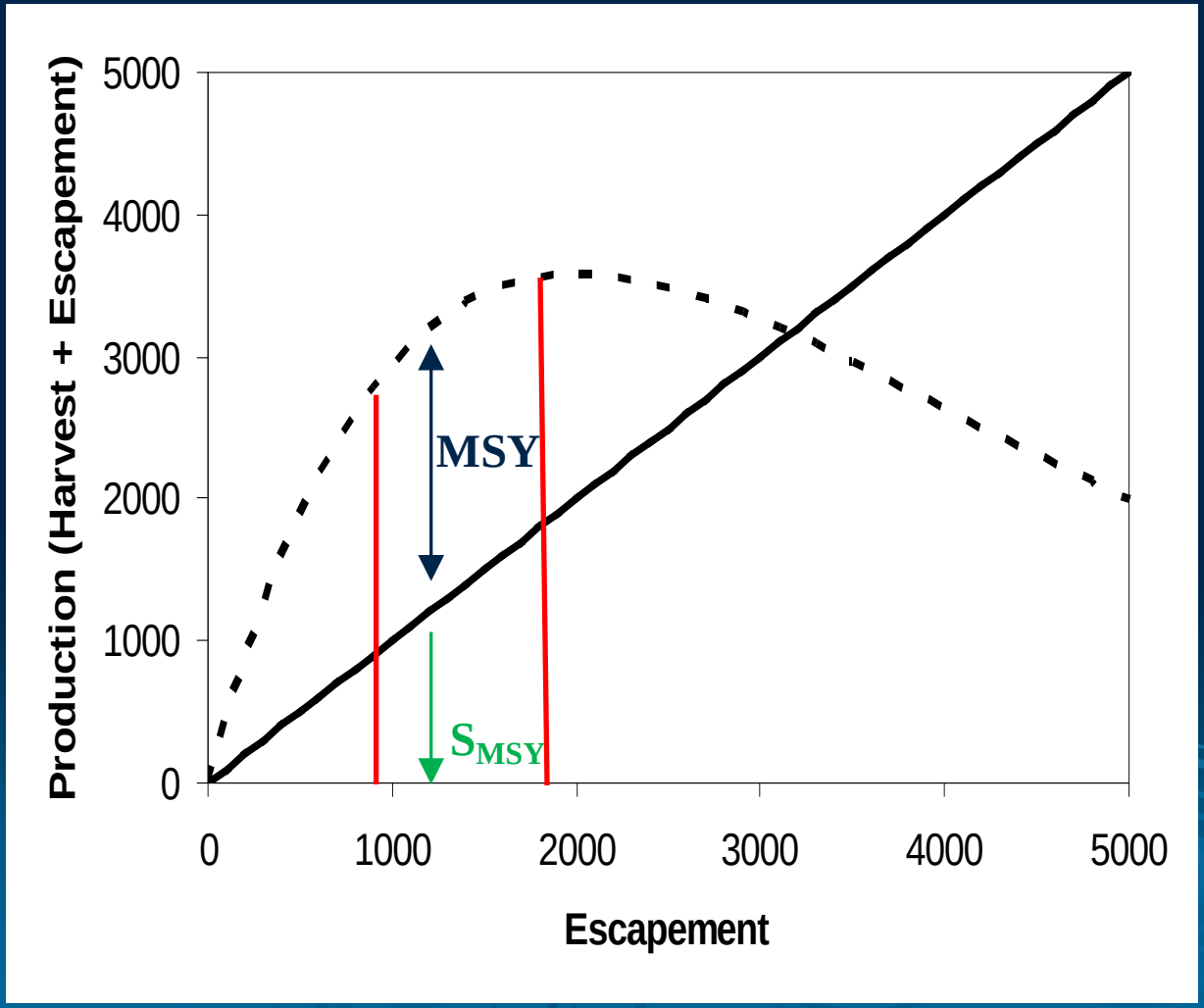
…and is associated with a level of escapement that is expected to produce MSY.



Uncertainty and Escapement Goals

A Simple Production Model:

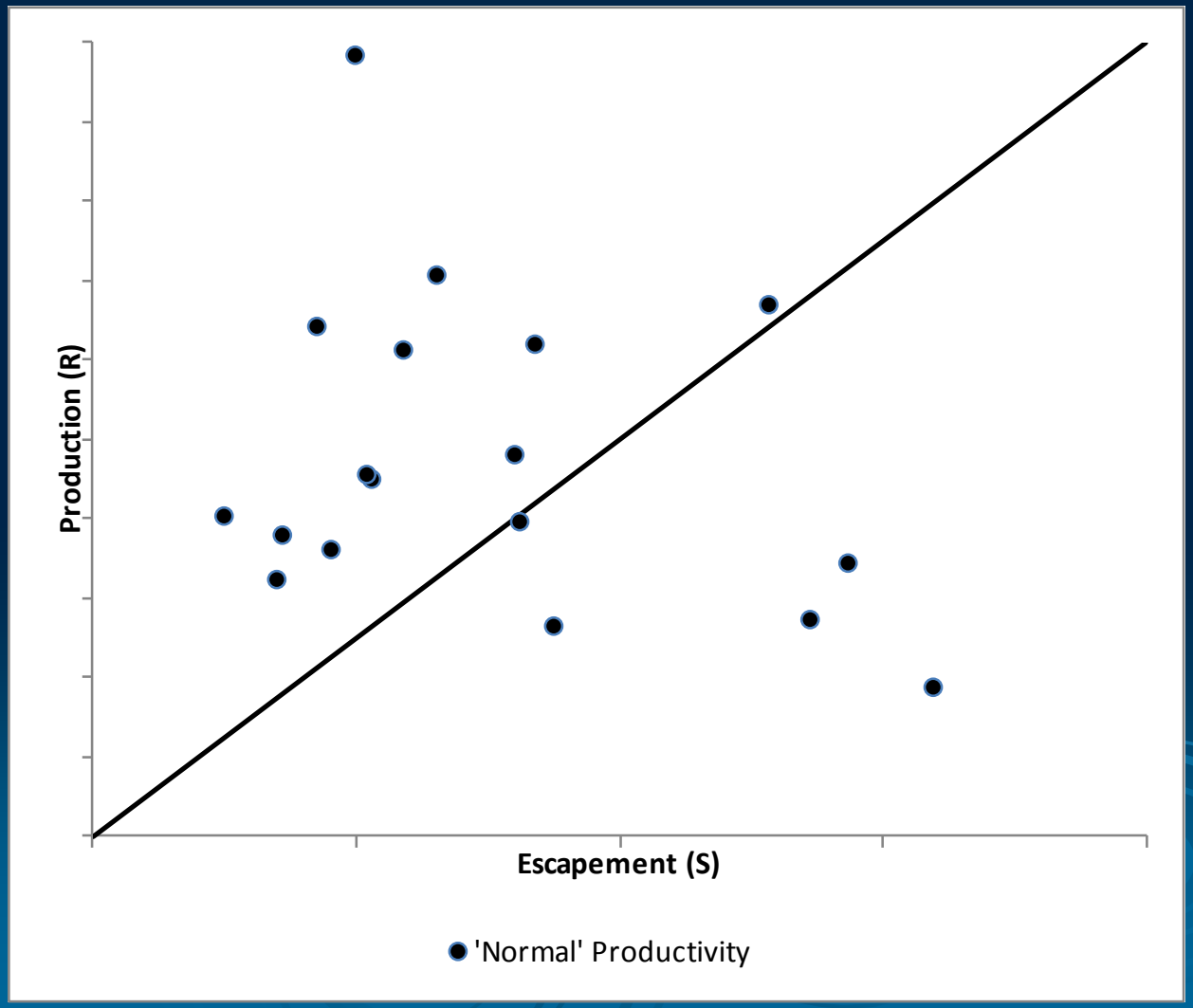
A range around the escapement that produces MSY is the theoretical basis of an escapement goal.



Uncertainty and Escapement Goals

Escapement Goals as Productivity Declines:

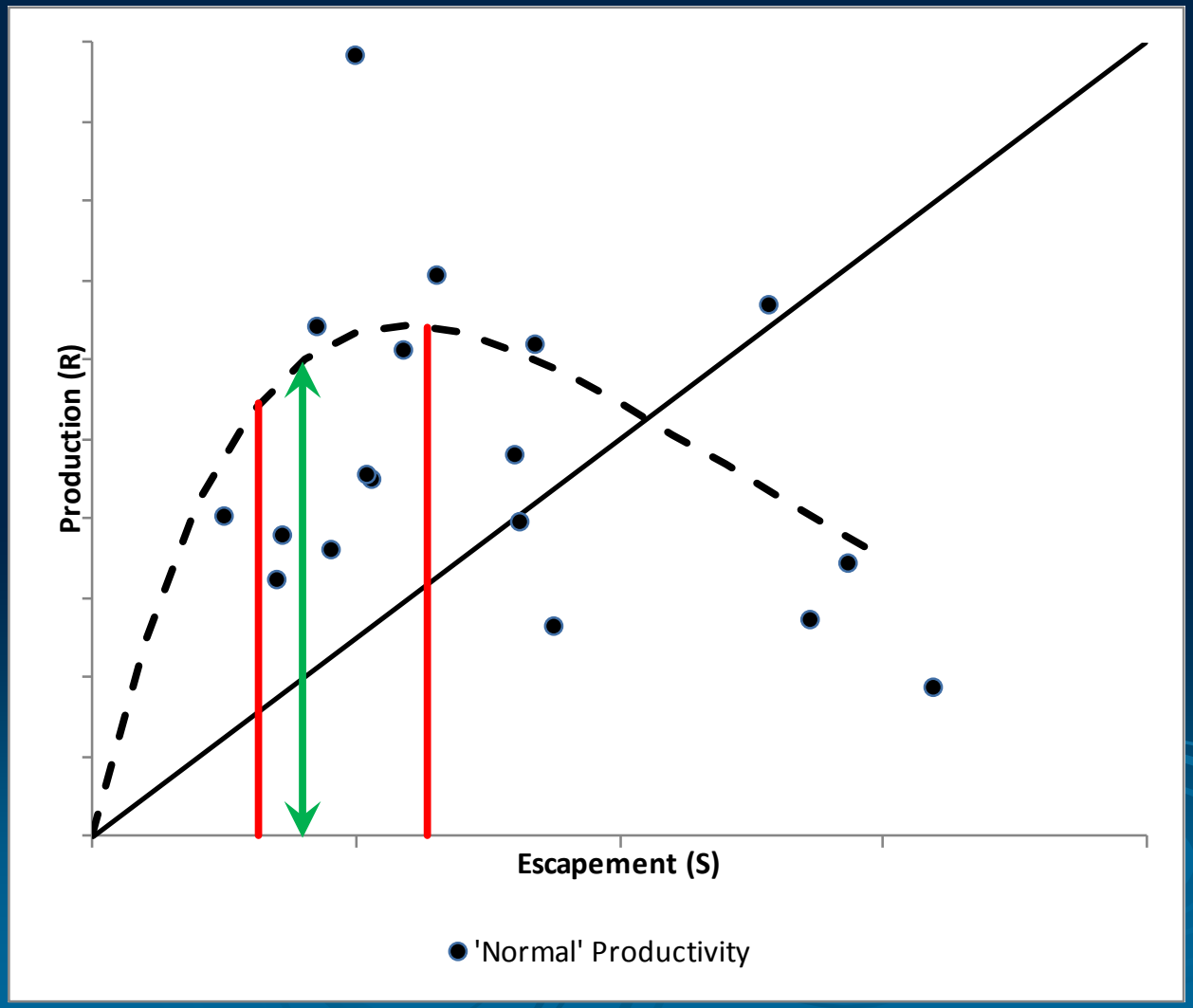
During a period of 'normal' productivity…



Uncertainty and Escapement Goals

Escapement Goals as Productivity Declines:

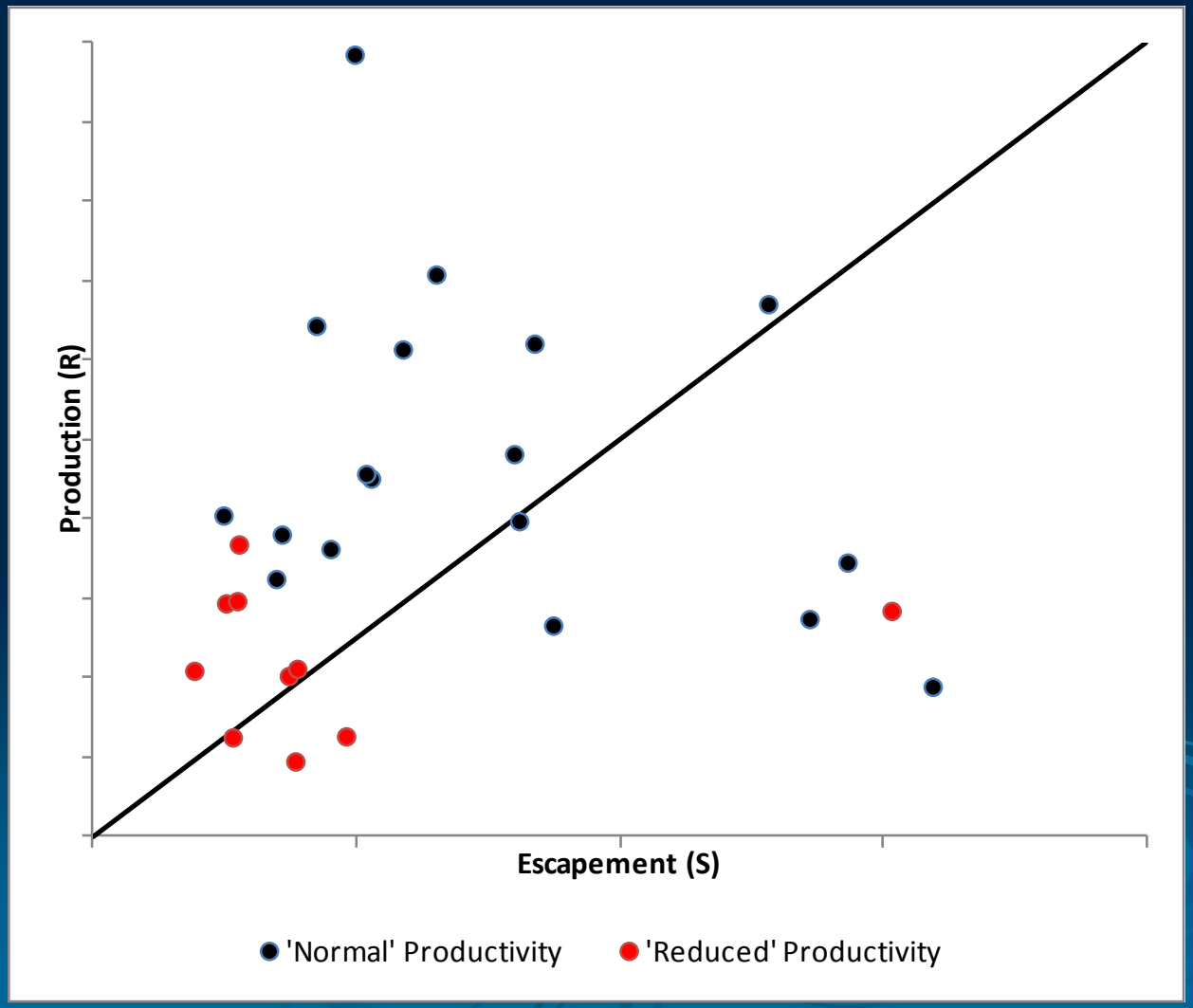
…we can fit the production model and develop an escapement goal range.



Uncertainty and Escapement Goals

Escapement Goals as Productivity Declines:

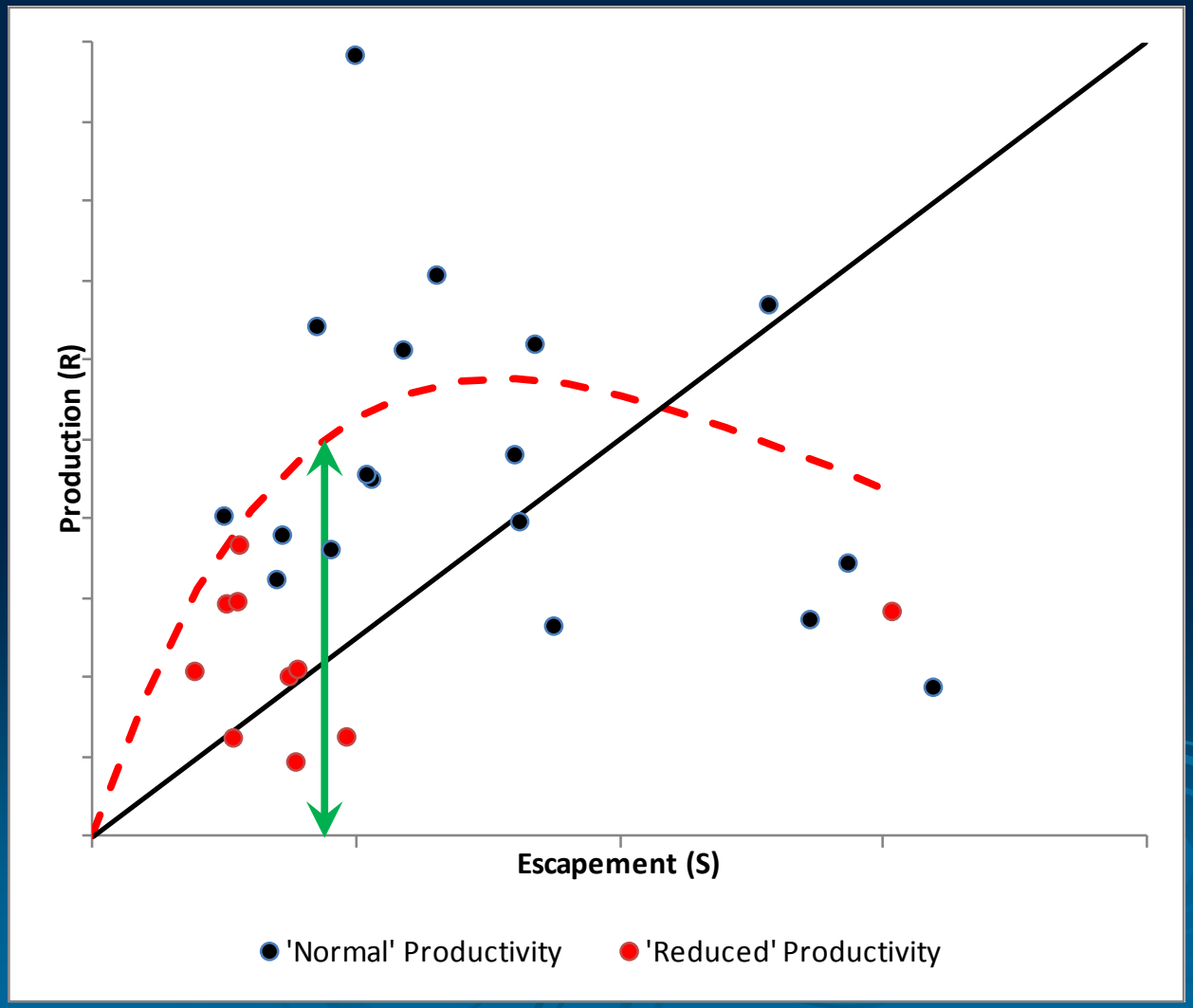
As productivity declines we will see reductions in **production and escapement**…



Uncertainty and Escapement Goals

Escapement Goals as Productivity Declines:

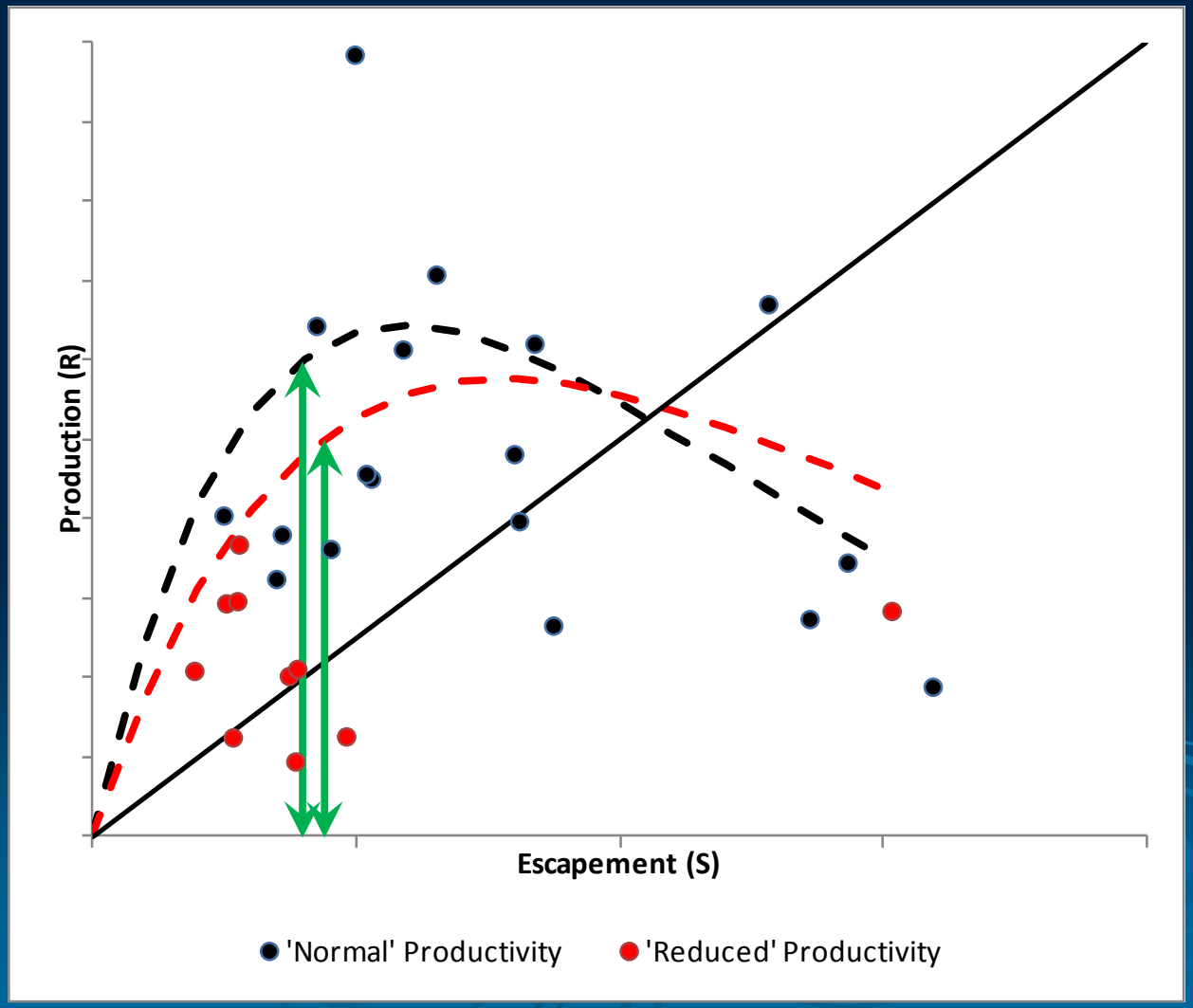
…and can fit a new production model to all of the data…



Uncertainty and Escapement Goals

Escapement Goals as Productivity Declines:

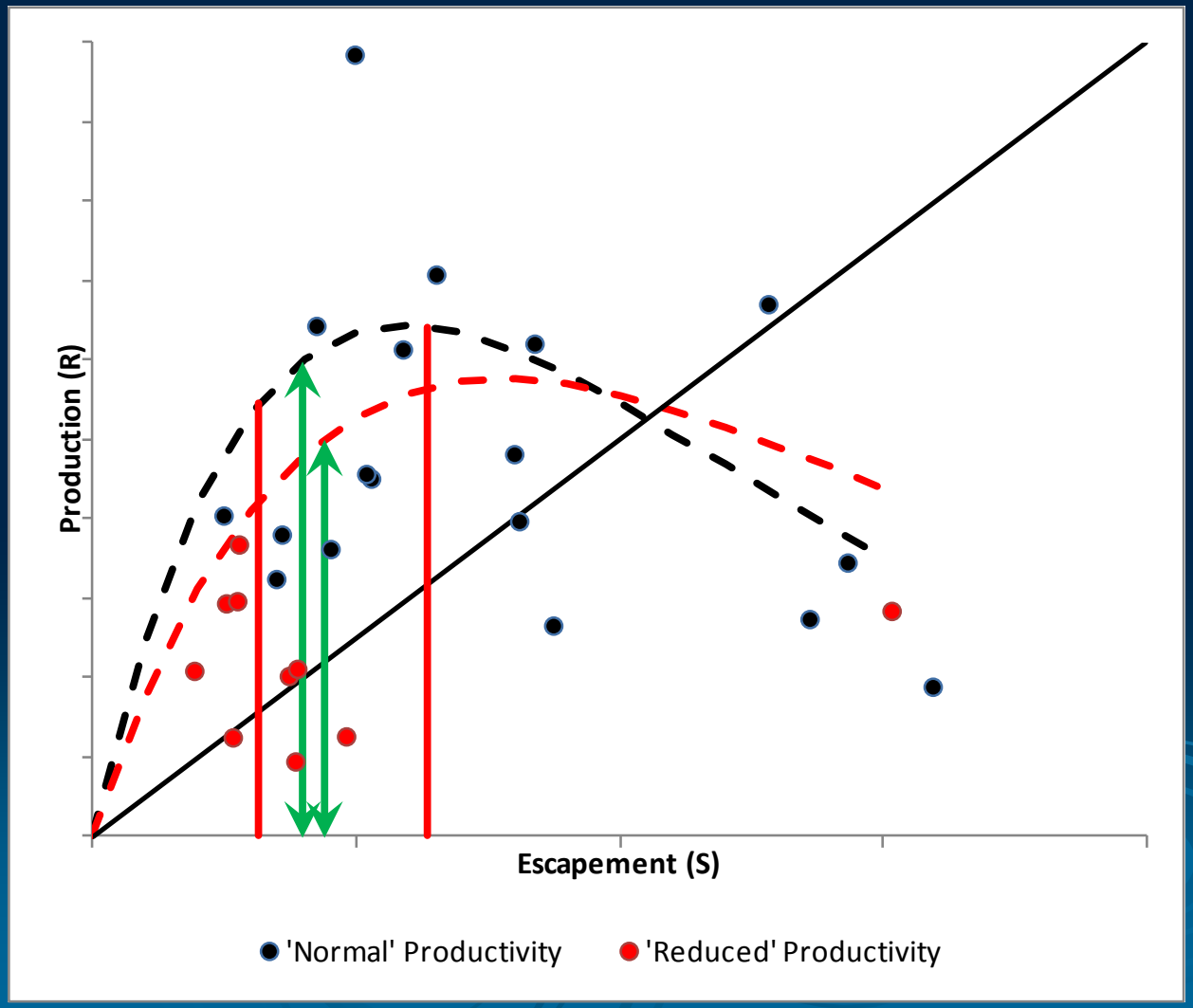
…but the estimate of S_{MSY} goes up only slightly.



Uncertainty and Escapement Goals

Escapement Goals as Productivity Declines:

The original escapement goal should not change as productivity declines.



Why Doesn't ADF&G use SETs?

- Smallest escapement, below which the stock's ability to sustain itself is jeopardized.
  - Escapements that have a high probability of extinction
- Only to be used "as needed" for conservation
  - History has shown they are not "needed"
- Conceptually difficult to estimate from observations
  - Escapement goal management prevents the observation of very low escapements
  - Need consistent observations at very low escapements

Why Doesn't ADF&G use SETs?

- SETs and Jeopardy
  - Species Effects – Average Productivity
  - Environmental Effects - Catastrophes
  - Demographic Effects – Individuals
  - Depensatory Effects – Space, Time, Movements
  - Genetic Effects - Inbreeding

Morris W.F. and D.F. Doak. 2002. Quantitative conservation biology. Sinauer Associates, Inc., Sunderland, MA. 480 p.

Why Doesn't ADF&G use SETs?

- SETs and "as needed"
  - Since 2000 – 26 unique stocks of concern
  - 12 unique stocks of yield concern
  - 14 unique stocks of management concern
  - Five of 12 stocks moved off of stock of yield concern
  - Eight of 14 stocks moved off of stock of management concern status

Why Doesn't ADF&G use SETs?

- SETs difficult to observe and estimate
  - Escapement goal management prevents consistent observation of very low escapements
  - Depensatory models need this information to estimate SET
  - Proxies for SET require reliable estimates of productivity

    AND carrying capacity

Proposals

- 218 – establish SETs for all stocks of concern
  - BOF not currently responsible for SETs
  - Not necessary for stocks of yield concern
  - Not needed to address stocks of management concern
  - Conceptually difficult to observe and estimate
- Department opposes this proposal

Proposals

- 219 – establish definitions for terms used in fishery management
  - Commonly used definitions already in SSFP
- Department opposes this proposal

Objectives of Presentation

- Overview of the *Policy for the Management of Sustainable Salmon Fisheries* (SSFP) and the *Policy for Statewide Escapement Goals* (EGP)

- Should escapement goals be lowered, raised, or stay the same when productivity is declining?

- What are sustained escapement thresholds (SETs) and why not use them?

- Proposals 218 and 219