

# Necessity of Reference Points for EBFM

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# Wisdom of the Ages

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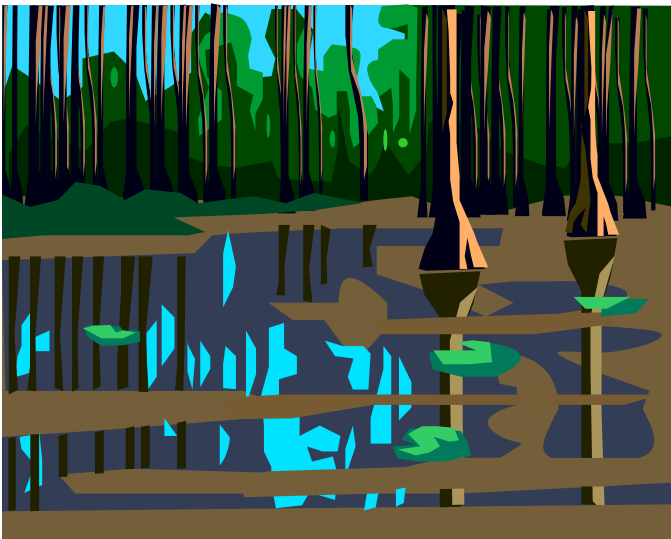
- “If one does not know to which port one is sailing, no wind is favorable.” Seneca



# Purposeful Management

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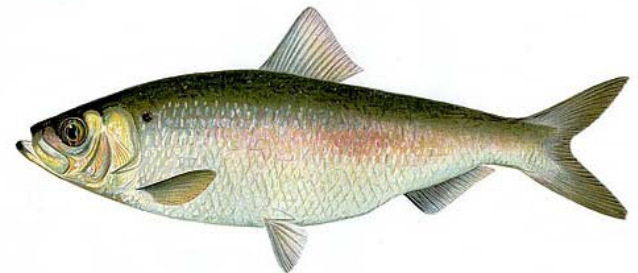
- To manage well, we require a vision of our destination
- Without this vision, we are unlikely to end up where we want to be



# Successful Management Requires...

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- Goals
- Objectives
- Reference Points



# Set Goals

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- Goals are general statements of what we would like to achieve
- E.g.,
  - High levels of catch
  - Happy stakeholders
  - Sustainability



# Determine Objectives

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- Objectives are more specific than the goals and are quantifiable
- E.g.,
  - Average catch of 8,000,000 lbs over the next decade
  - 50% reduction in complaints by stakeholders during the next two years
  - No decrease in population size during the next decade
- You cannot determine success or failure without measurable objectives!



# Reference Points

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- Provide a way to determine whether objectives have been met
  - Quantitative
  - Responsive to management
  - Measurable or estimable
  - Prioritized



# Biological Reference Points (BRPs)

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- Estimates of fishing mortality, biomass, and yield that achieve a fishery objective
- Used as guidelines in fisheries management





# Targets and Limits

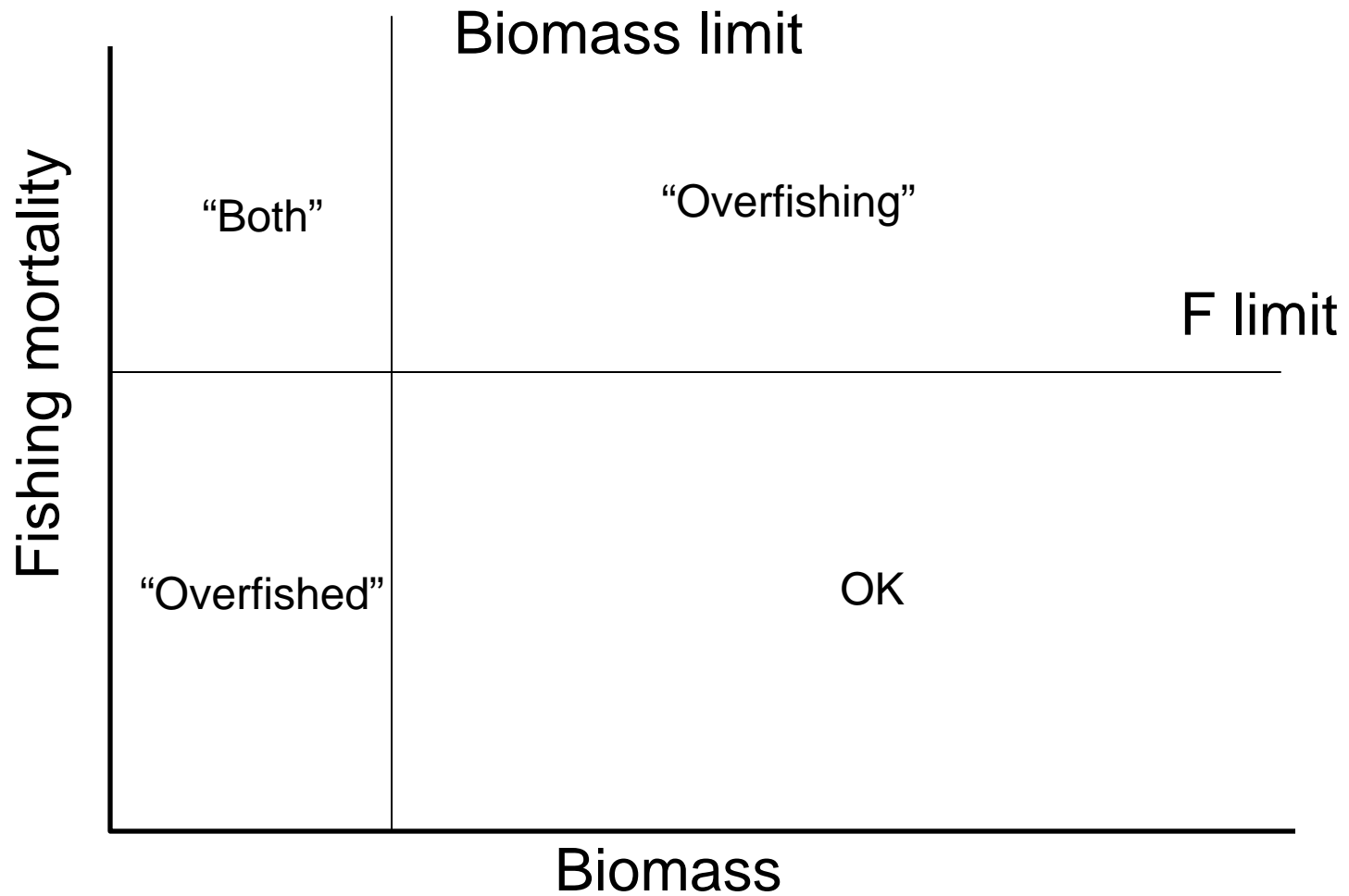
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- Target – value we would like to attain
- Limit – threshold value we do not want to cross

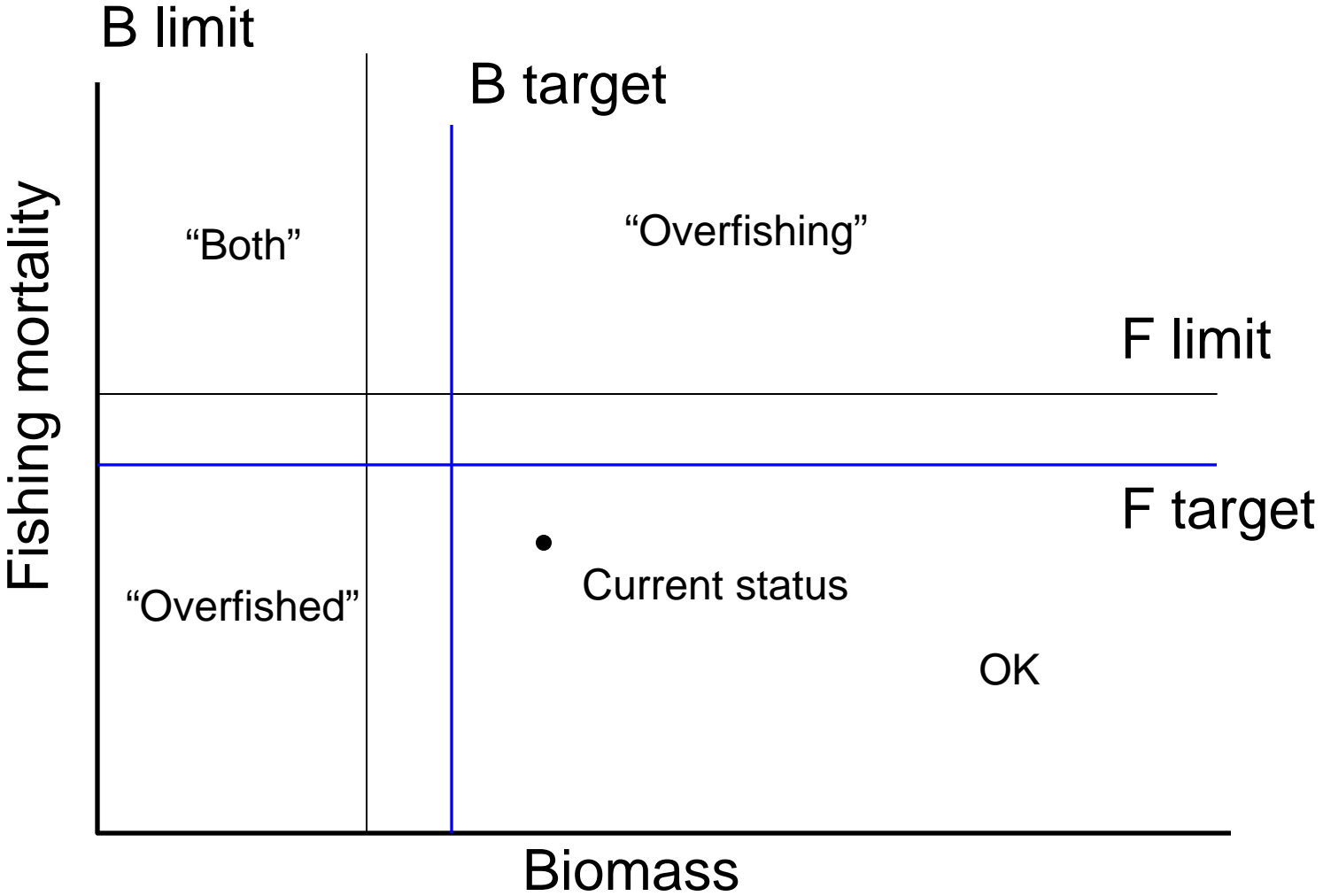


# Reference Points in Management

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# Reference Points in Management



# Common Goals of Fisheries Management

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- Optimum sustainable yield
- Sustainability
  - Prevents fishing mortality rates from being too high (overfishing)
  - Prevents abundance from becoming too low (overfished)



# BRPs in Practice

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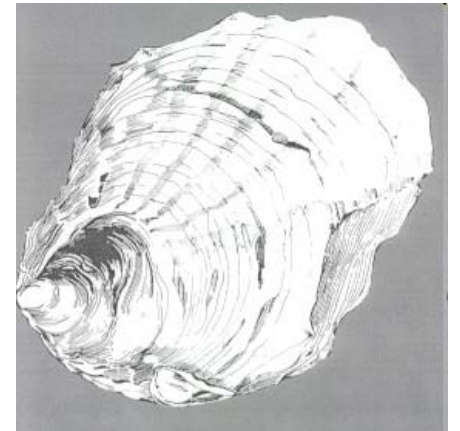
- Limit reference points often based on maximum sustainable yield (MSY)
  - Biomass
  - Fishing mortality
- Target reference points often based on simplified approaches



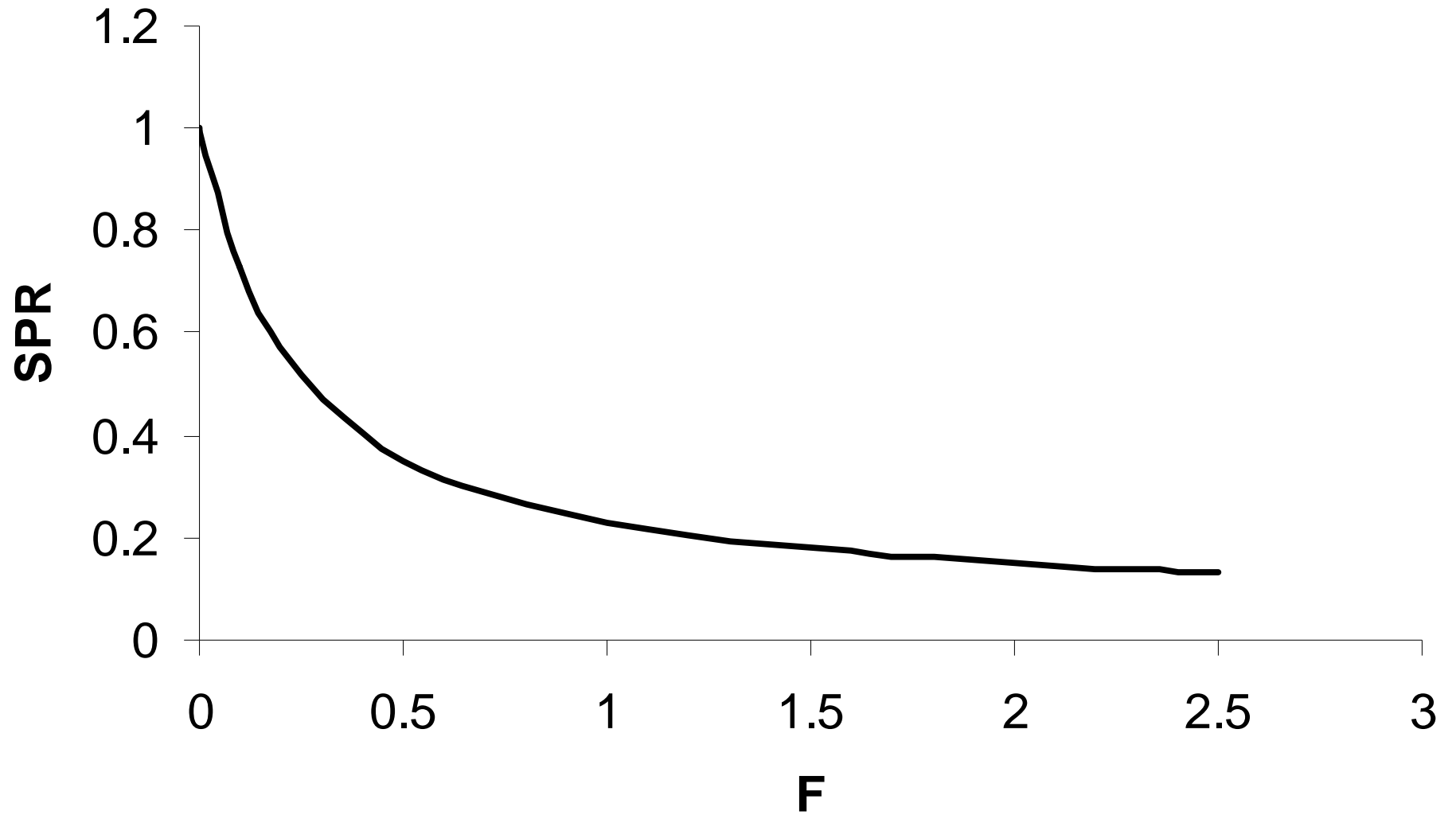
# Spawning Potential Ratio (SPR)

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- Goal is to determine how much lifetime spawning potential is reduced by fishing or other mortality source
- Combine mortality, growth, and maturation
- Deterministic models



# SPR



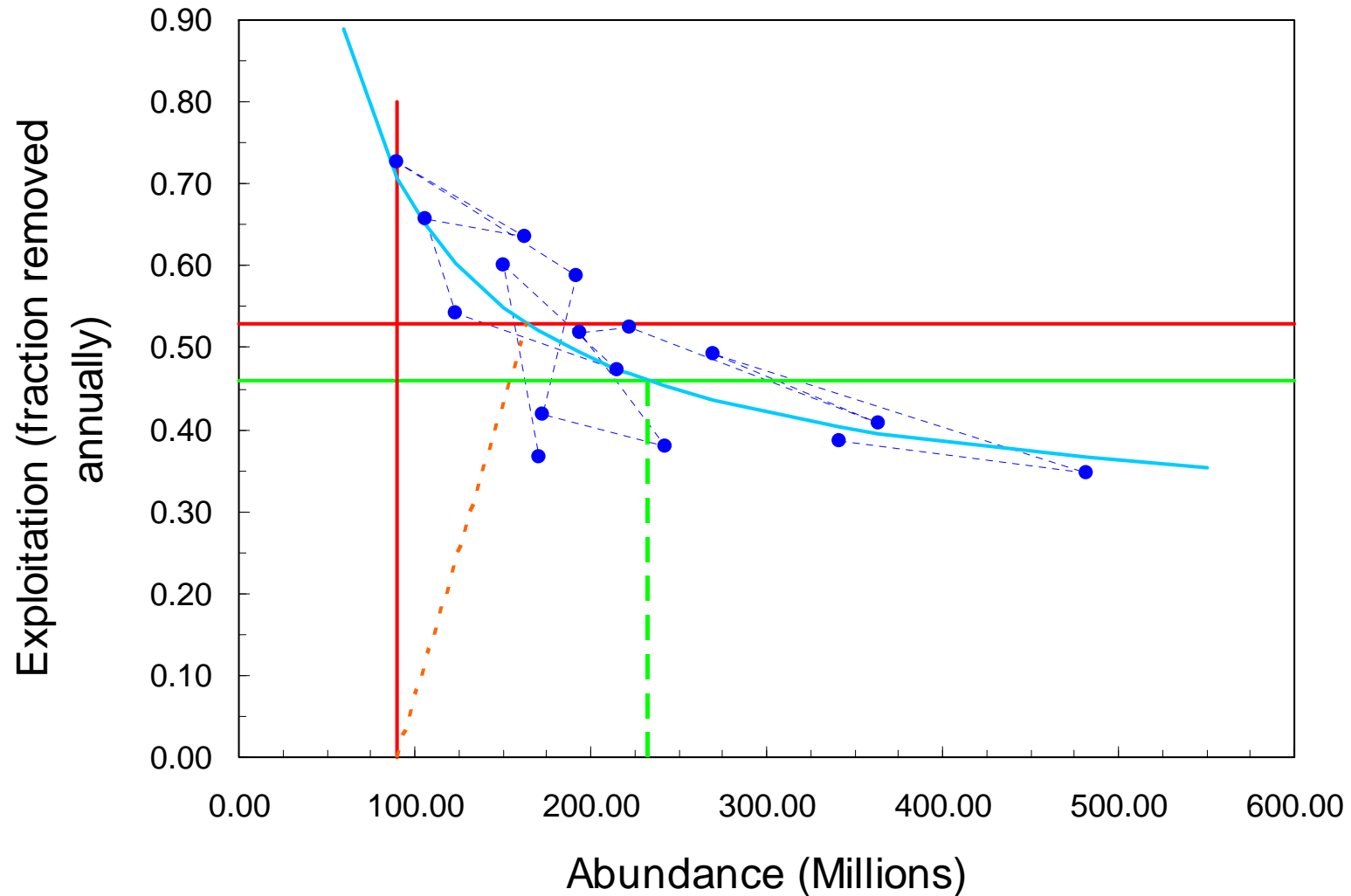
# SPR uses

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- 35% suggested as a general limit reference point
- 40% now commonly used as a target reference point, but higher values (50% to 60%) have been suggested for some species



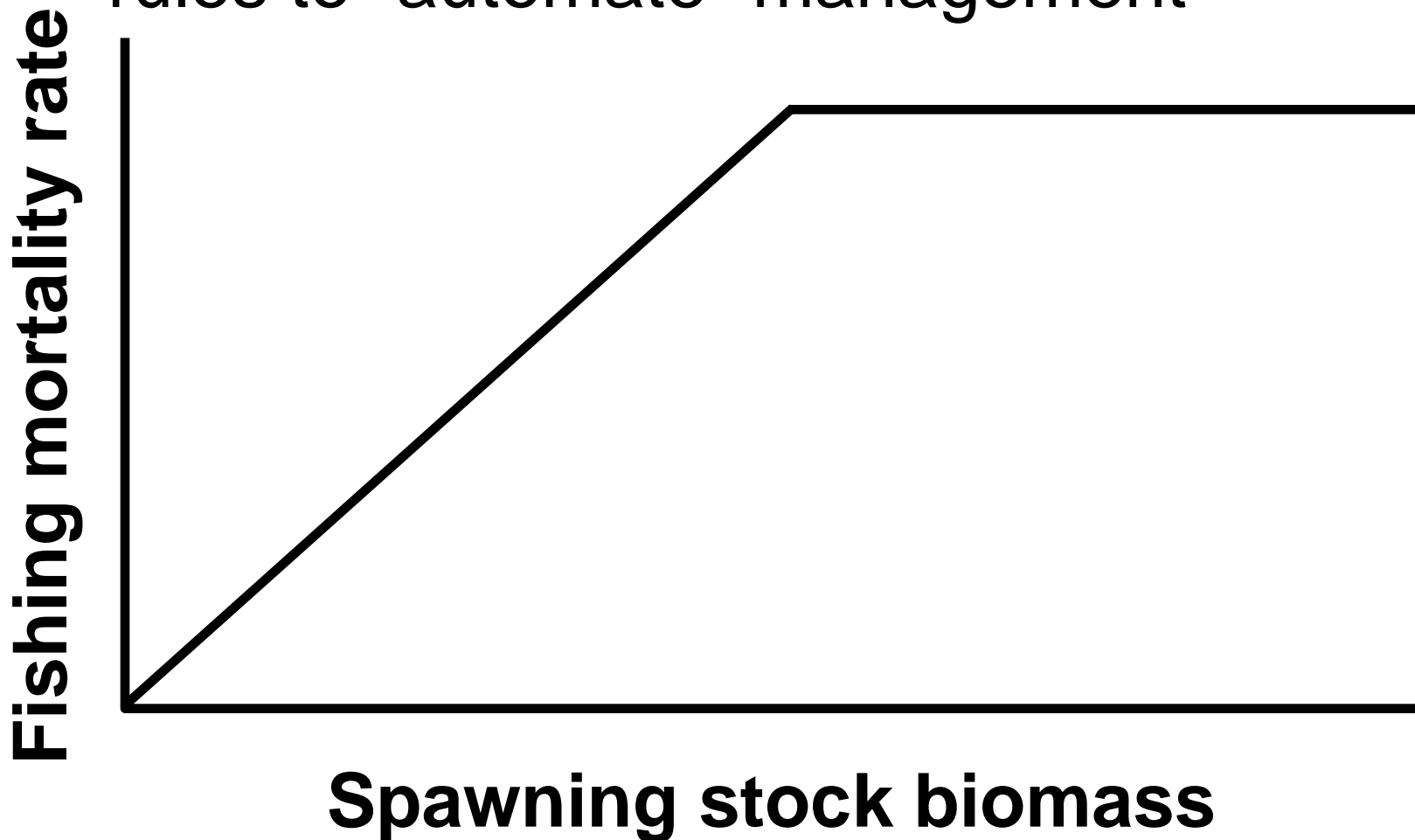
# Blue Crab Reference Points



# Control Rules

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- Reference points can be used in control rules to “automate” management



# Summary

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- Reference points are necessary for purposeful management
- They have a successful history in fisheries management
- Reference points can be developed from simple models and rules of thumb
- They must be quantitative, oriented toward management actions, measurable, and prioritized

# Final Thoughts...

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- "If You Don't Know Where You're Going, Any Road Will Get You There." --The Cheshire Cat, Alice In Wonderland

