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ABC Control Rules & Scientific Uncertainty

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National Standard 1

"Conservation and management measures shall **prevent overfishing** while achieving, on a continuing basis, the **optimum yield** from each fishery for the United States fishing industry."

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Optimum Yield

The term "optimum", with respect to the yield from a fishery, means the amount of fish which--

A. will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and *taking into account the protection of marine ecosystems*;

B. is prescribed as such on the basis of the maximum sustainable yield from the fishery, *as reduced by* any relevant economic, social, or ecological factor; and

C. in the case of an overfished fishery, *provides for rebuilding* to a level consistent with producing the *maximum sustainable yield* in such fishery.

Simultaneously preventing overfishing and obtaining optimum yield requires either:

perfect knowledge and control, or

Including prevention of overfishing in the spec. of optimum yield

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MSRA 2006: Annual Catch Limits (ACLs)

Fishery management plans shall "establish a mechanism for specifying annual catch limits …… at a level such that overfishing does not occur in the fishery, including measures to ensure accountability."

—MSA Section 303(a)(15)

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MSRA: ACL, ABC and SSC

ACLs may not exceed a Council's Scientific and Statistical Committee's fishing level recommendation

Each SSC shall provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch (ABC), preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices.

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2009 Update to National Standard 1 Guidelines

- Add guidance on new (MSRA) requirements
  - —Annual catch limits (ACLs)
  - —Measures for Accountability (Accountability Measures or AMs)
  - —Acceptable biological catch (ABC)
- Explain their relationship to existing requirements
  - —Maximum sustainable yield (MSY)
  - —Optimum yield (OY)
  - —Status determination criteria (SDC) for defining "overfishing" and "overfished"

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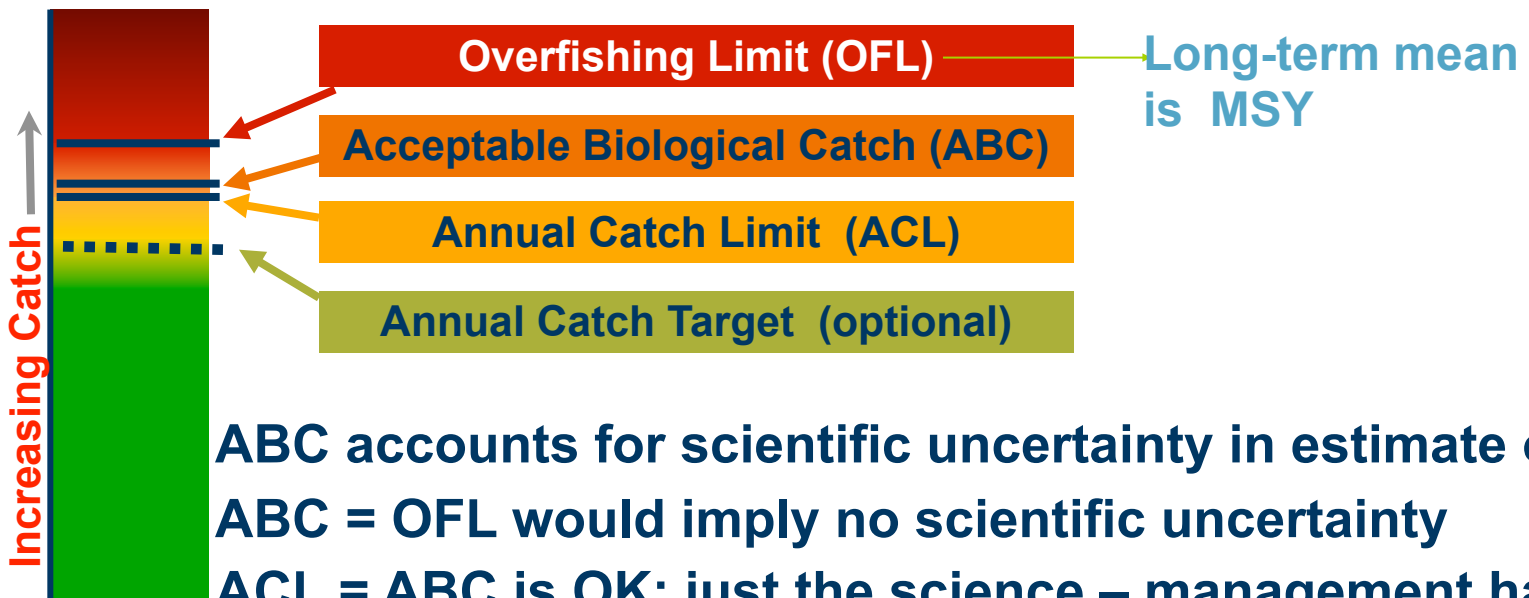
Annual Catch Reference Points



ABC accounts for scientific uncertainty in estimate of OFL

ABC = OFL would imply no scientific uncertainty

ACL = ABC is OK; just the science – management handoff

ACT = ACL, or no ACT, would imply perfect control of catch

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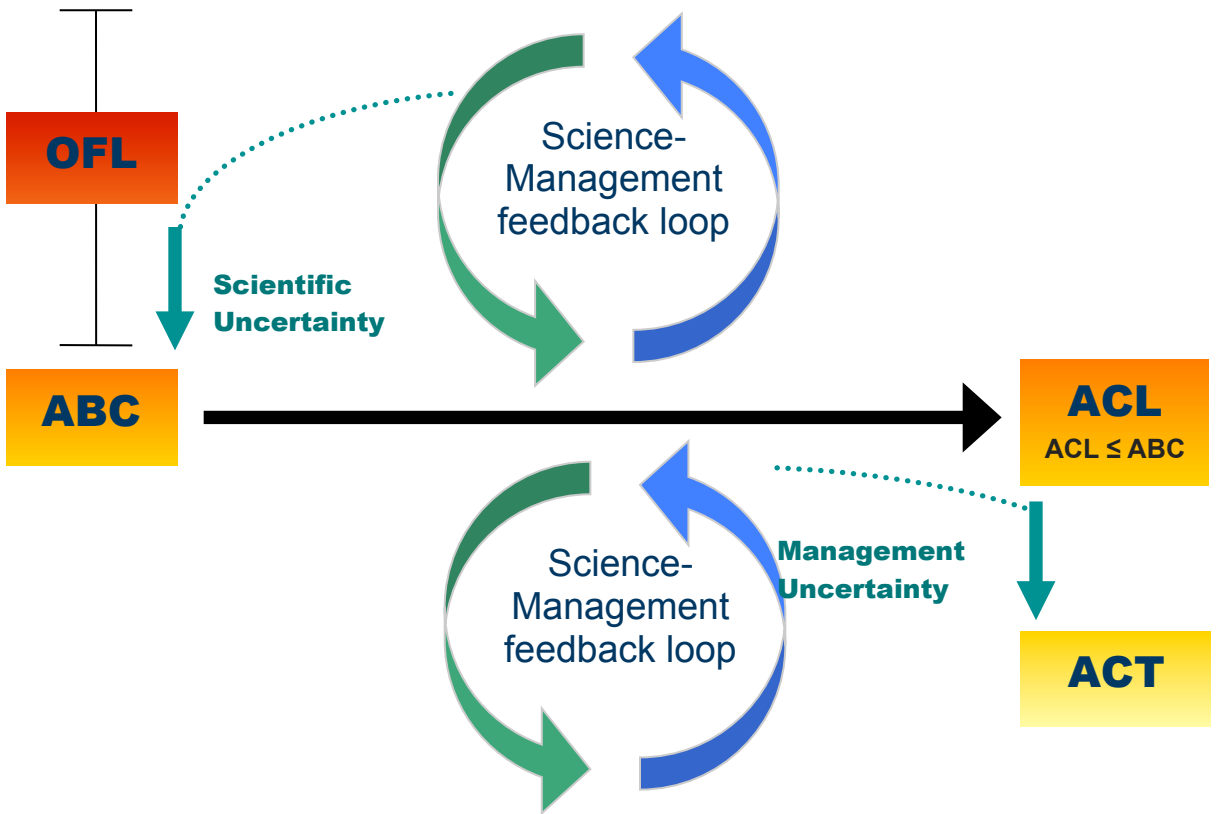
Roles in Setting ACLs

SSC Role

Council Role



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Goal for ABC

- ABC: A level of annual catch that has an acceptable probability ($p^* < 50\%$) of not exceeding the true, but imperfectly estimated, OFL
- Assessment error can perpetuate for several years until fundamentally new information is available, so cumulative effect of $p^* = 50\%$ could be quite risky
- Stocks at low biomass levels and/or high vulnerability to effects of overfishing can warrant greater protection against overfishing

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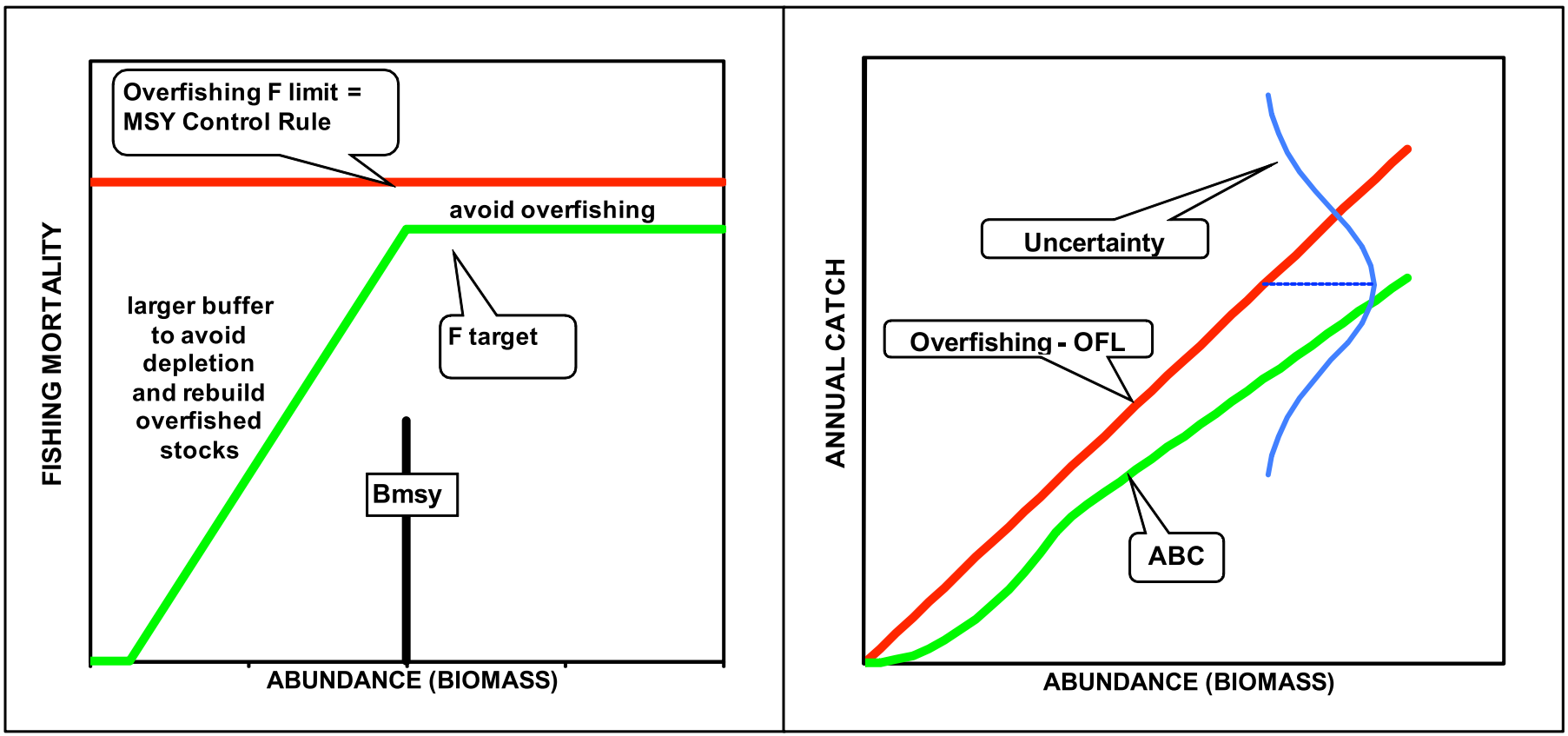
Control Rule: Protocol



Uncertainty is in biomass and in the level of Fmsy (e.g. steepness of the OFL line)

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Targets and Limits: Not a New Concept

"Another common element in the application of the precautionary approach to fisheries management worldwide is the specification of "targets" that are safely below limits. Setting OY at its limit (MSY in the Magnuson-Stevens Act) would not normally be precautionary because there could be a high probability of exceeding the limit year after year. Under the precautionary approach, the target should be set below the limit taking uncertainty and other management objectives into consideration. Development of control rules requires communication between fisheries managers, scientists, industry and the public."

Technical Guidance On the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. 1998. Restrepo et al.

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More from 1998

"….. a recommended default target control rule that could be used in the absence of more specific analyses. The default sets the target fishing mortality rate 25% below the default limit proposed in Section 2. The 25% reduction constitutes a safety margin that may not perform well for all stocks in terms of preventing overfishing. The performance of the default target can only be evaluated on a case-by-case basis and will depend on (a) the accuracy and precision of stock size, B and F estimates, (b) MSY and natural variability in population dynamics, and (c) errors in the implementation of management regulations."

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ABC is a Tool for Optimum Yield

- ABC is designed to prevent overfishing annually, so is a modified biological maximum
- Optimum Yield (OY) determination is long-term and should be supported by a more comprehensive risk analysis that also takes into account:
  - Ability to control the catch to not exceed the ABC
  - Social and economic benefits obtained from commercial and recreational fishing
  - Bycatch and ecosystem considerations

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Applying ACLs for each "managed fishery"

- MSRA requires Councils to develop ACLs for "each of its managed fisheries"
- FMPs vary in their inclusiveness of stocks:
  - —Only target stocks of the fishery, vs.
  - —Both target and non-target stocks for greater ecosystem considerations
- NS1 Guidelines now provide a distinction between "the fishery" and stocks included in the FMP for ecosystem considerations.

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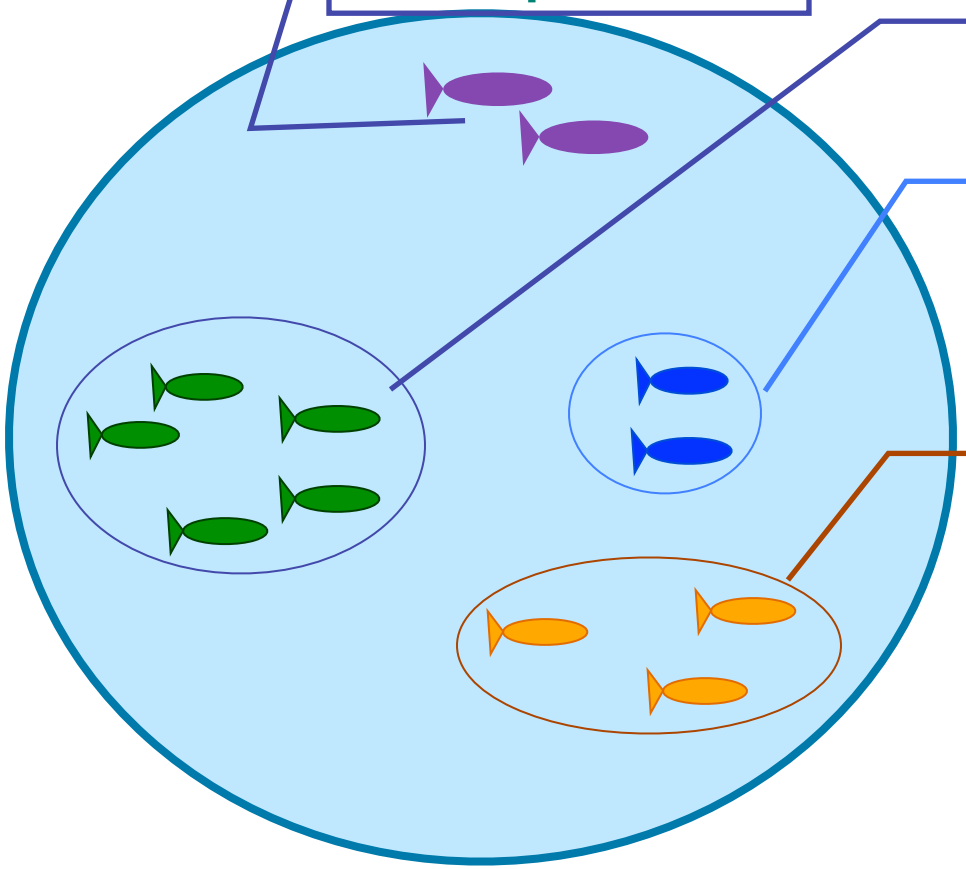
Stocks



Ecosystem Components

Fishery Components

Target stocks

Non-target stocks retained for sale or personal use

Non-target stocks *not* retained that are, or could likely become, subject to overfishing or overfished

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Vulnerability Evaluation

Vulnerability Evaluation

- Is a simple evaluation of a stock's vulnerability to being overfished
- Takes into account measures of the stock's productivity
- And the stock's susceptibility (exposure) to the fishery

Vulnerability Evaluation can help inform:

- The degree of precaution appropriate in setting an annual catch limit
- Whether to allow expansion of a fishery for a data poor stock
- Whether it is appropriate to combine stocks into an assemblage
- Priorities for stock assessment

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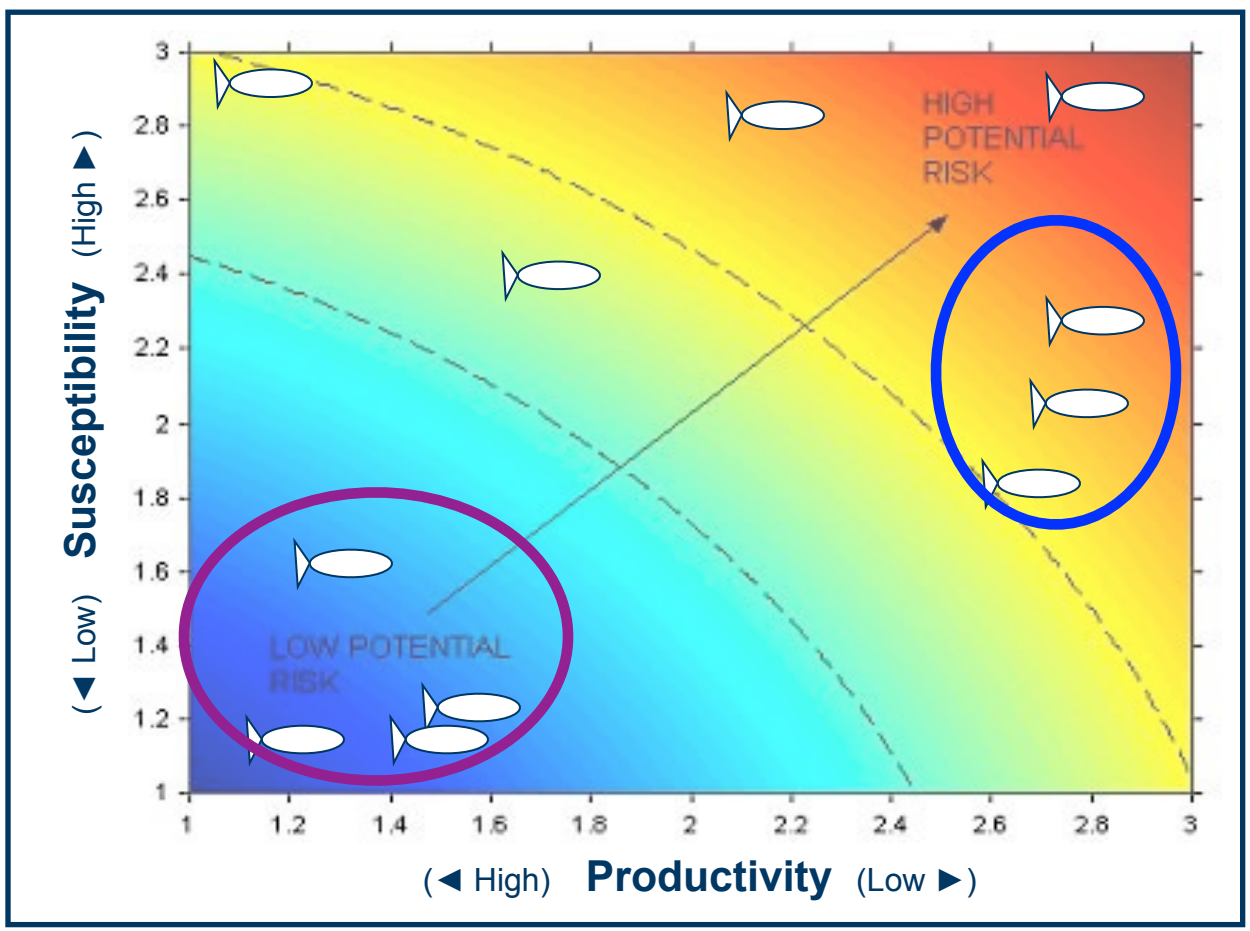
Forming Stock Complexes with Vulnerability Scores



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Catch Only Scenarios

- What if only information is incomplete data about historical catch, some biological data, and local knowledge?
- First step could be a panel of scientific and local experts. Question:
  - —Is the level of catch that has been allowed to occur:
    - too little?
    - too much?
    - Or in ballpark of just right?

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Catch Only Scenarios

Historical Catch	Expert Judgment	Possible Action
Nil, not targeted	Inconceivable that catch could be affecting stock	Not in fishery; Ecosystem Component; SDC not required
Small	Catch is enough to warrant including stock in the fishery and tracking, but not enough to be of concern	Set ABC and ACL above historical catch; Set ACT at historical catch level. Allow increase in ACT if accompanied by cooperative research and close monitoring.

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Harder Catch Only Scenarios

Historical Catch	Expert Judgment	Possible Action
Moderate	Possible that any increase in catch could be overfishing	ABC/ACL = f(catch, vulnerability) So caps current fishery
Moderately high	Overfishing or overfished may already be occurring, but no assessment to quantify	Set provisional OFL = f (catch, vulnerability); Set ABC/ACL below OFL to begin stock rebuilding

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Questions?

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