Agenda Item D.4
Supplemental Presentation 1
Workshop report
November 2019

Outcomes of the 3-4 October CSNA Workshop

Part 1: Estimating abundance and monitoring trends

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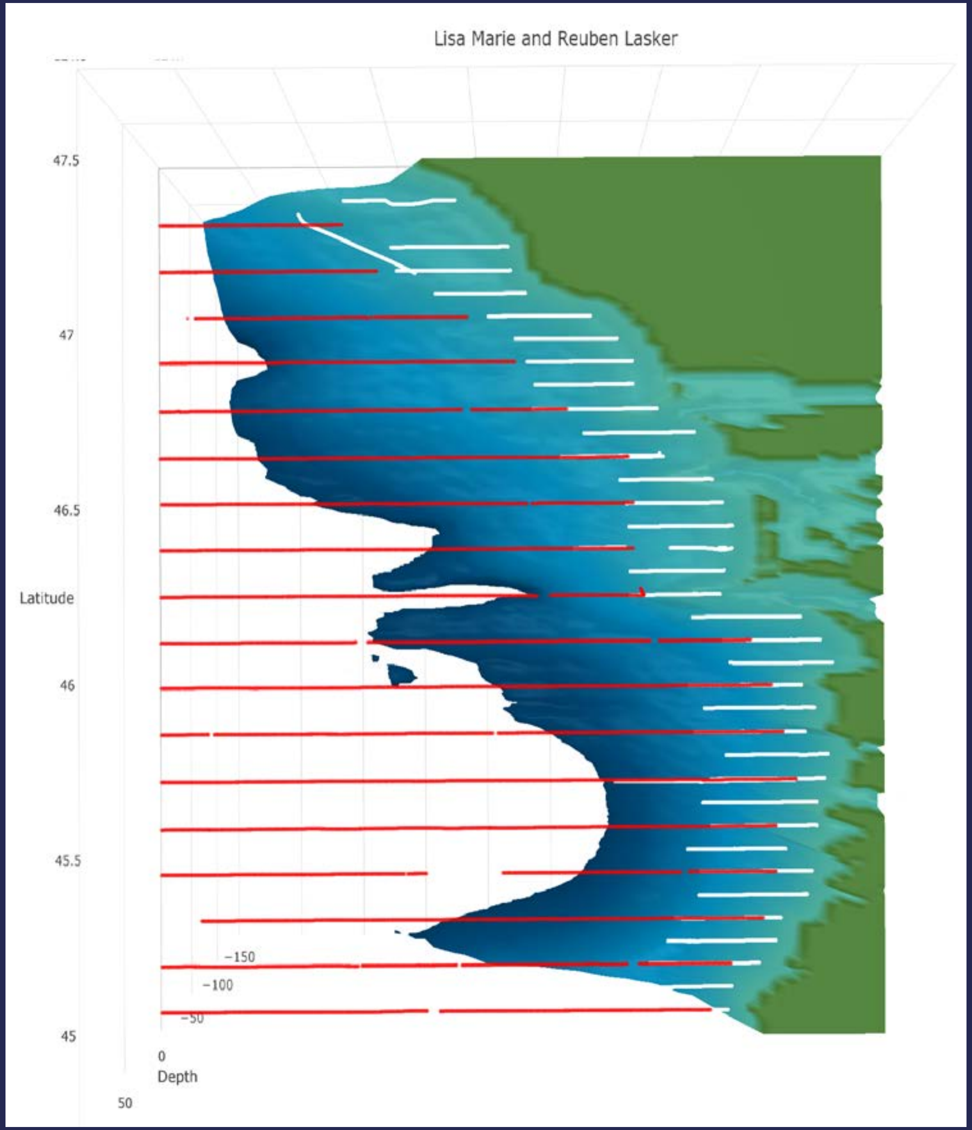
College of the Environment

Nearshore estimation methods to complement the NOAA acoustic trawl method survey

2018 CIE Methodology review:

ATM survey can be used for management of the CSNA if:

- inshore area is addressed; and
- an MSE is conducted.



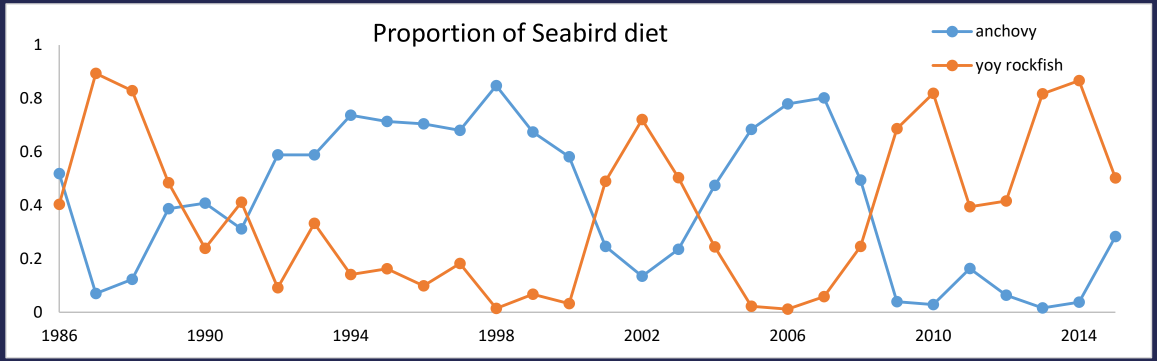
Options considered by the workshop:

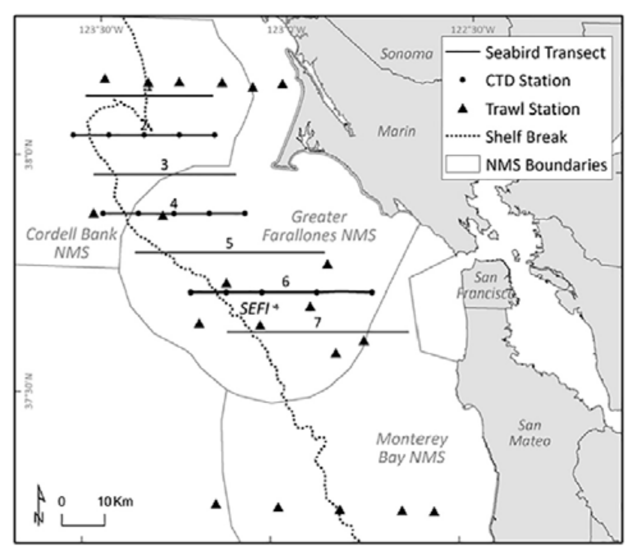
- **Collaborative acoustic research using industry vessels**
  - Can reduce minimum operating depth from ~20m to ~5m; can also collect biological data
- **Saildrones with acoustic sampler**
  - Can operate closer to shore but not in the Southern California Bight
- **Extrapolation offshore to inshore densities**
  - May be the only approach in some areas / years
- **Aerial survey methods**
  - Needs careful coordination with the ATM survey & a method to collect biological data

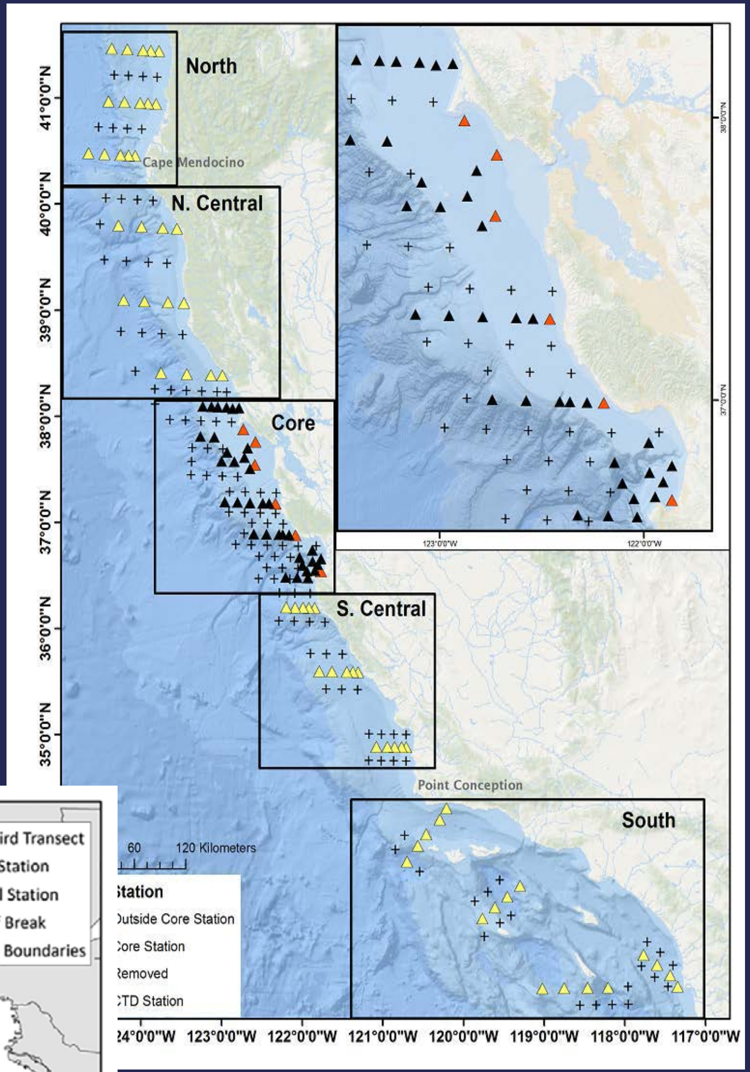
Images c/o NOAA & CDFW

Alternative viable methods for indexing abundance:

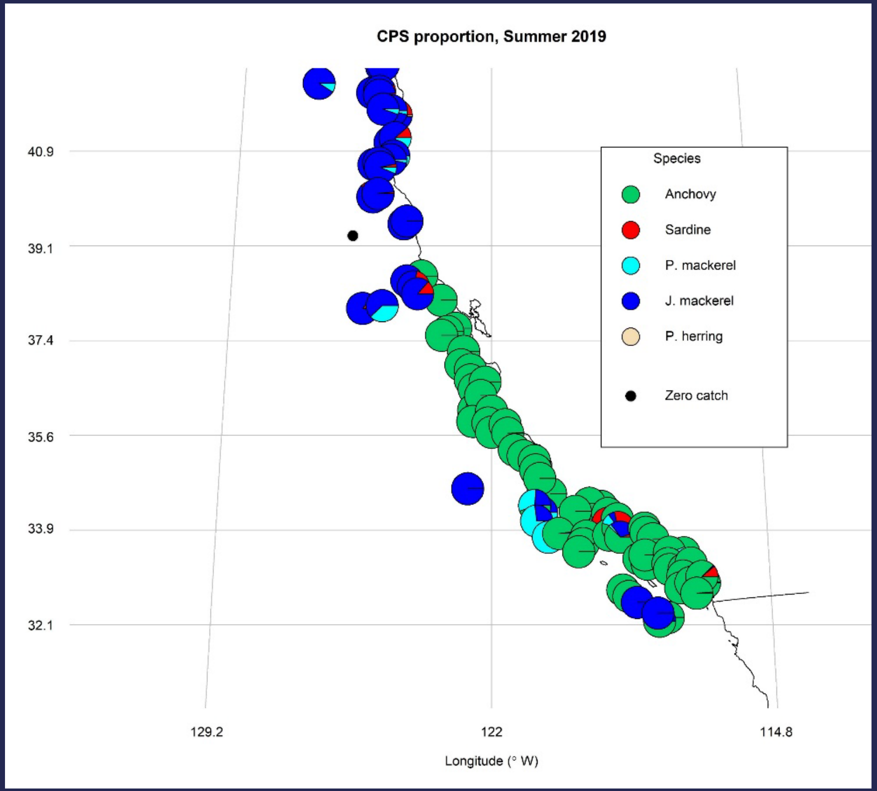
- Daily Egg Production Method (DEPM)
  - Approved for use in anchovy management by the SSC
- CalCOFI data (i.e. DEPM-lite)
- SWFSC Rockfish Recruitment and Ecosystem Assessment Survey (RREAS)
- Applied California Current Ecosystem Studies (ACCESS) Survey
- CDFW San Francisco Bay monitoring
- Seabird and marine mammal diets







Key Conclusions:



- Direct synoptic observations (collaborative acoustics, saildrone acoustics, aerial survey) preferred to extrapolation
- Collaborative acoustic sampling is most comparable to the ATM survey and can collect biological data
- Data providers need to coordinate if CSNA biomass estimates are to be produced.
- ATM survey (with nearshore correction) is the preferred approach; DEPM and the SWFSC RREAS survey are next most comprehensive; other surveys have limited spatial coverage.

Outcomes of the 3-4 October CSNA Workshop

Part 2. Frequency, triggers, and accountability measures for revisiting reference points at specific stock levels: A look at a flowchart framework

Presented by Gregory Krutzikowsky

BACKGROUND

OFL	STOCK SPECIFIC MSY PROXY
ABC	OFL * 0.25
ACL	Equal to ABC or reduced by OY considerations.

$$OFL = E_{MSY} * \text{Estimate of Average Biomass in US waters}$$

Expected level of fishing that produces maximum sustainable yield

BACKGROUND

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Working Group Approach

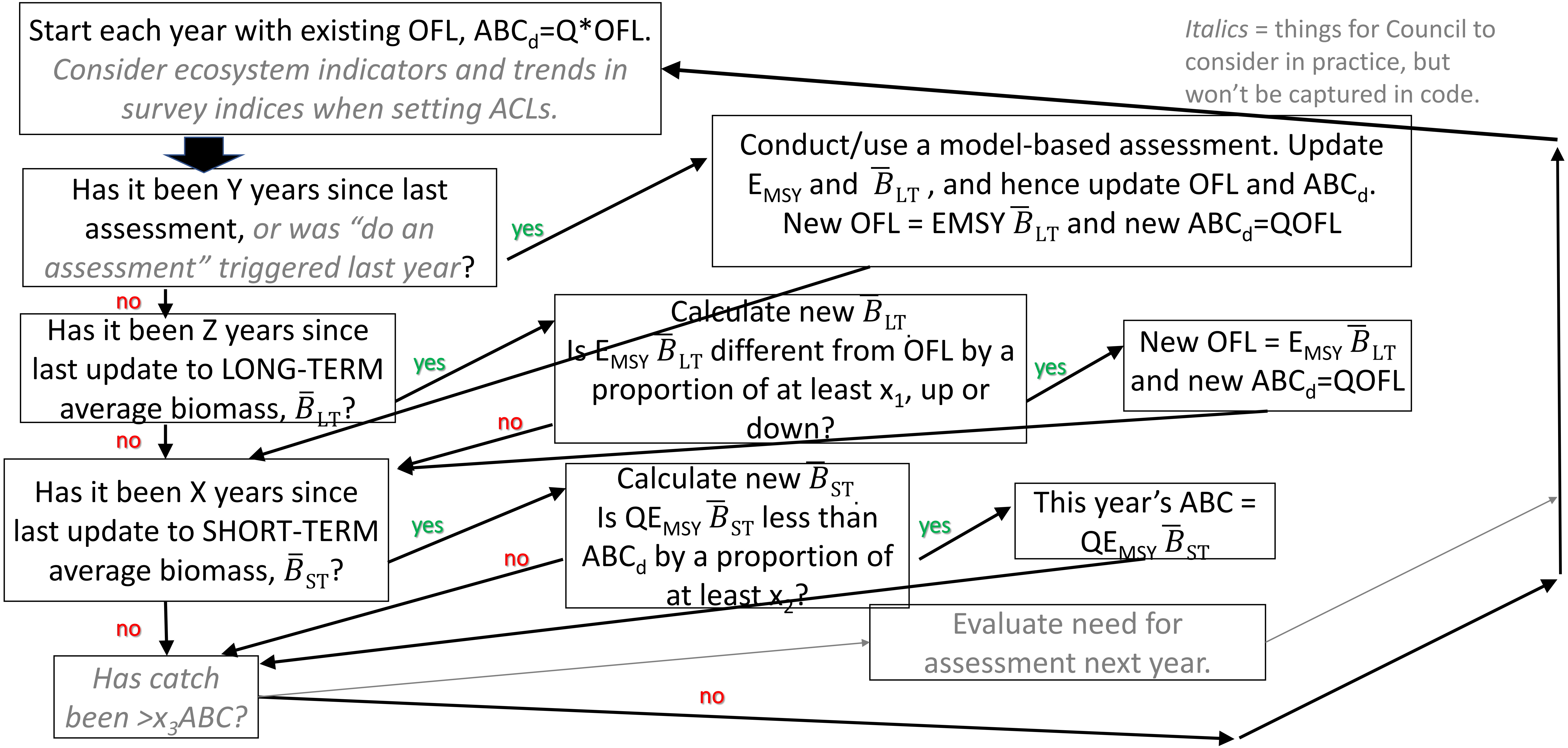
- Examined frequency to revisit specifying the OFL and the ABC and developing accountability measures to be triggered at specific stock levels.
- Developed a flowchart for process of regularly checking the status of the CSNA stock abundance with metrics to trigger management actions.
- Flowchart informs modeling work which can be used to examine and evaluate the tradeoffs.

Working Group Approach

Options for accountability measures examined include:

1) Y = Interval to conduct a full modeled stock assessment;
2) Z = Interval for updating the long-term average biomass estimate ($\bar{B}_{\mathrm{LT}}$) from scientific surveys;
3) x_1 = threshold for changes in the OFL due to changes in $\bar{B}_{\mathrm{LT}}$ from surveys (proportion or %);
4) X = Interval for updating the short-term average biomass estimate ($\bar{B}_{\mathrm{ST}}$) from scientific surveys;
5) x_2 = threshold for reducing the ABC in response to a low $\bar{B}_{\mathrm{ST}}$ survey estimate (proportion or %);
6) Considering potential changes to the ABC buffer, Q;

Flowchart:
One Possible Framework



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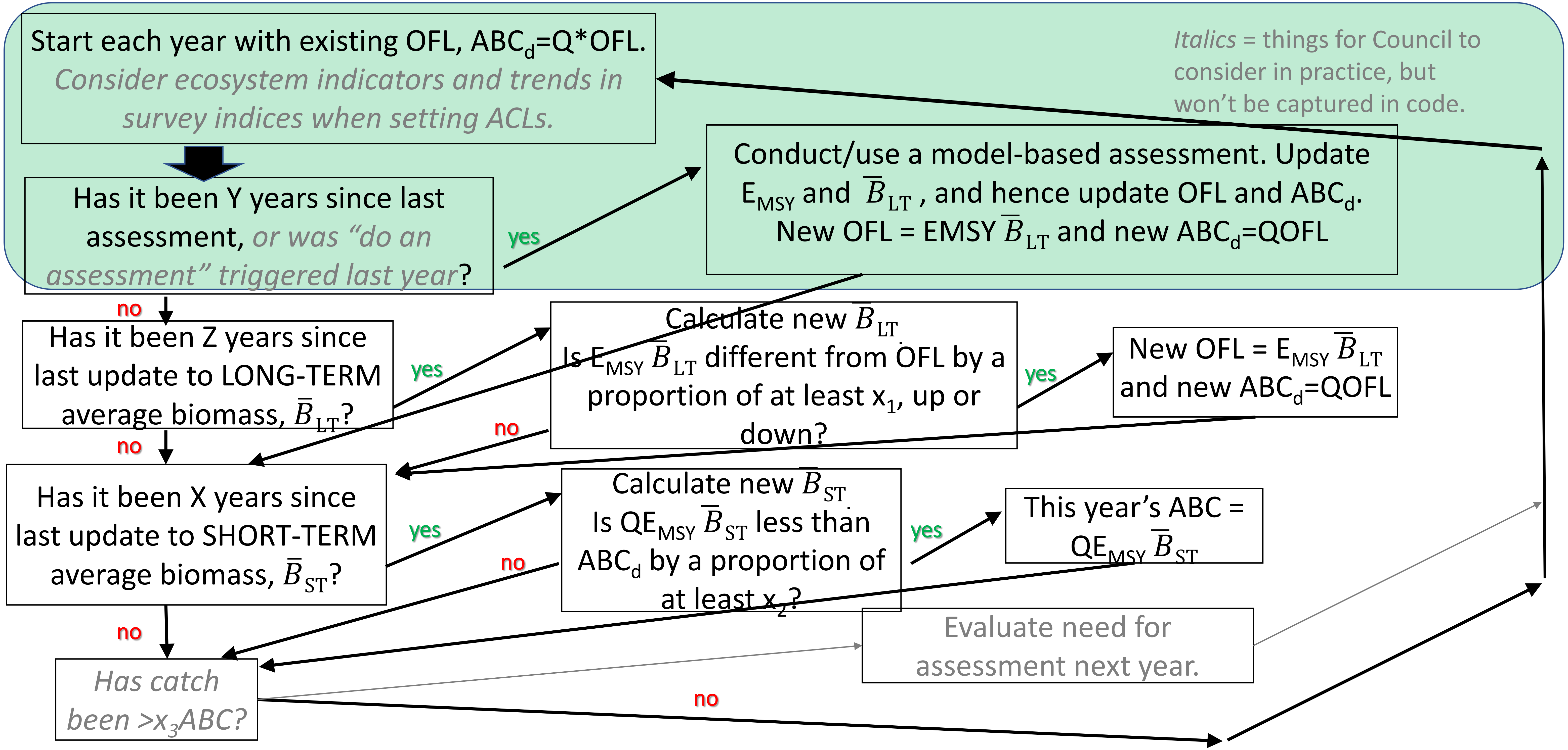
Z = interval for updating long-tem biomass (from survey)
X = interval for updating short-tem biomass (from survey), X ≤ Z ≤ Y.

Q = ABC buffer. Now 0.25, might be larger with more frequent updates.
x_1 is the threshold for changes in OFL due to changes in B_{LT}
x_2 is the threshold for reducing ABC in response to low B_{ST}
x_3 is a threshold for attainment



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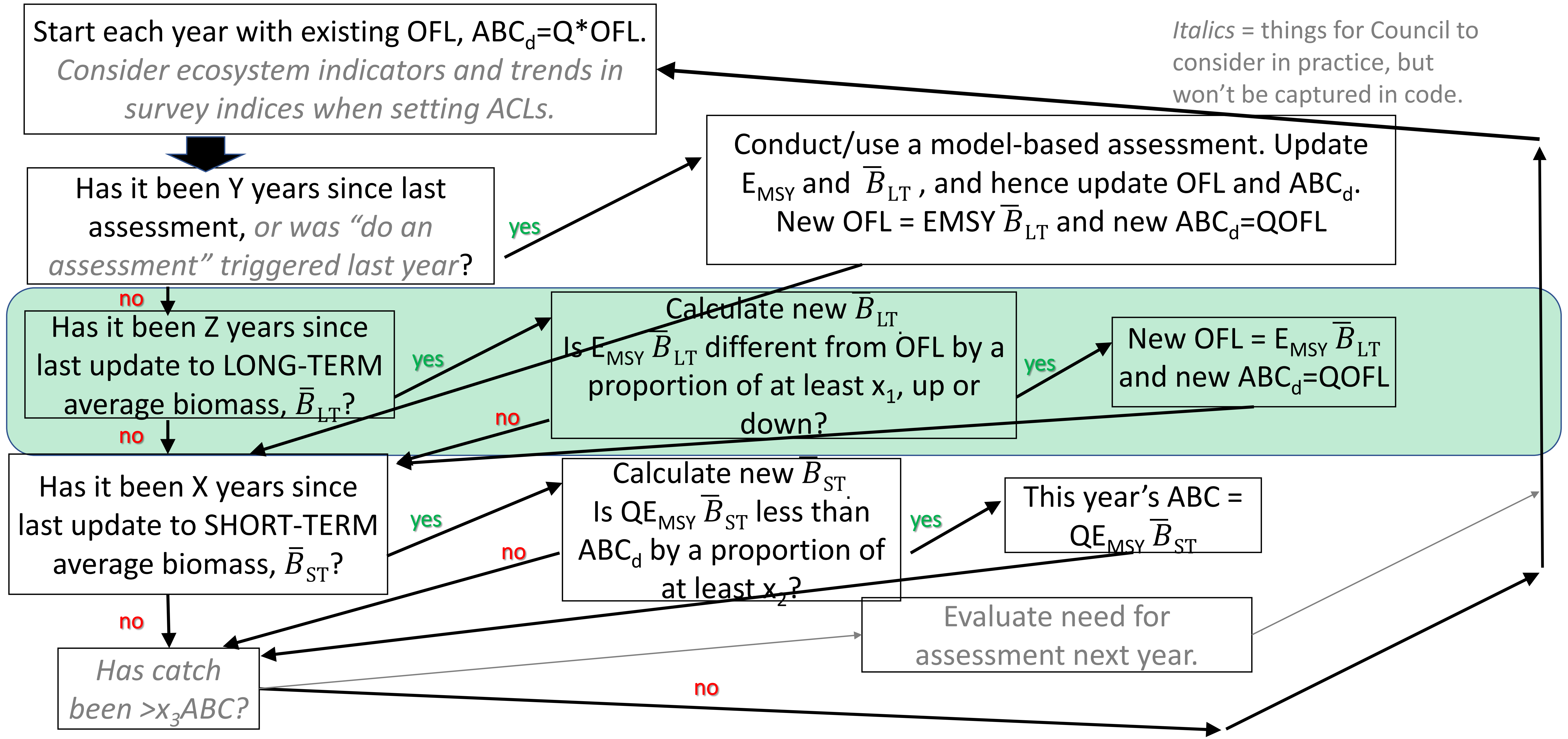

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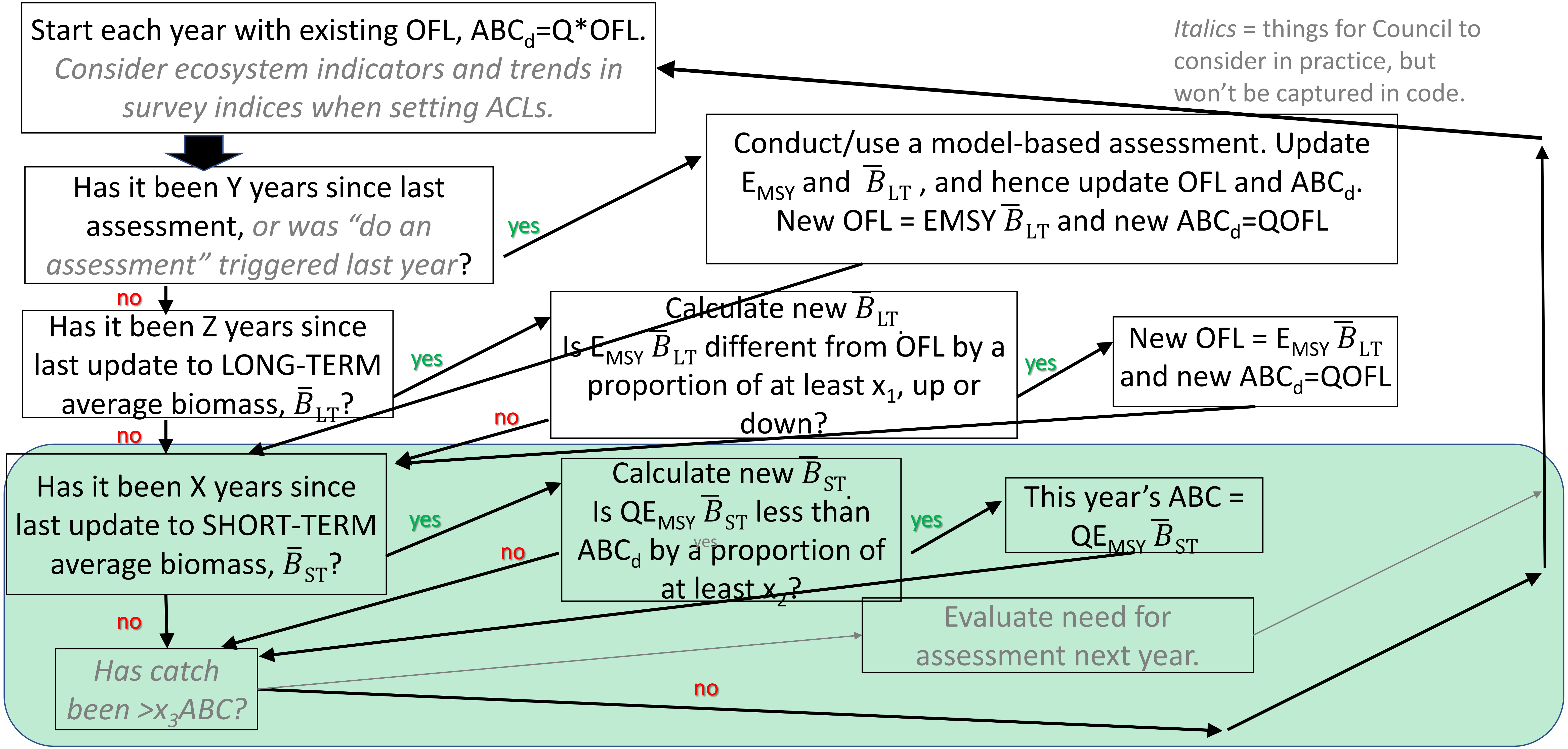

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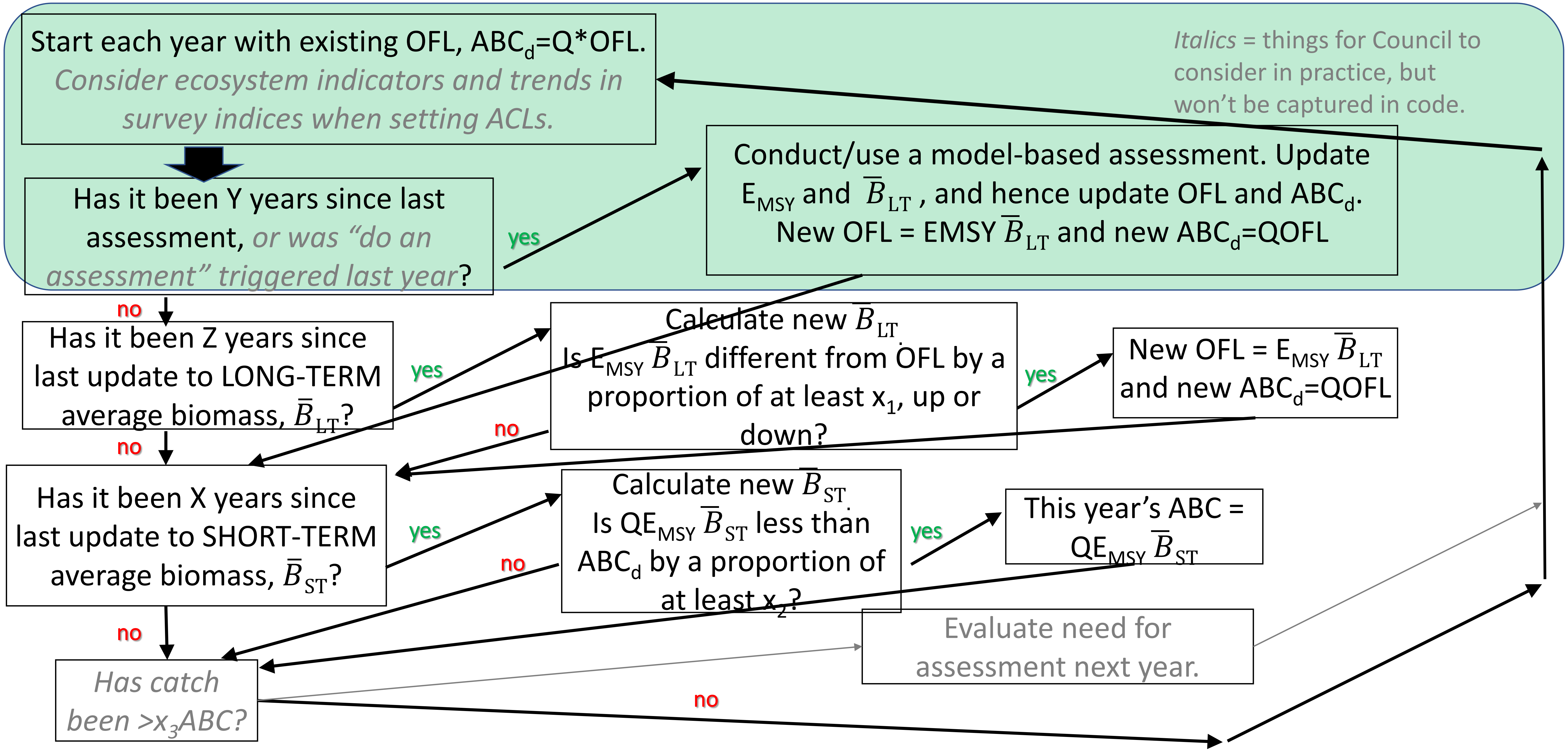

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Management Action in Flowchart Framework: Determine if it's Time for a New Assessment Then Evaluate the Ecosystem when setting ACLs

Italics = things for Council to consider in practice, but won't be captured in modeling code.

Start each year with existing OFL, ABC_d=Q*OFL. *Consider ecosystem indicators and trends in survey indices when setting ACLs.*

↓

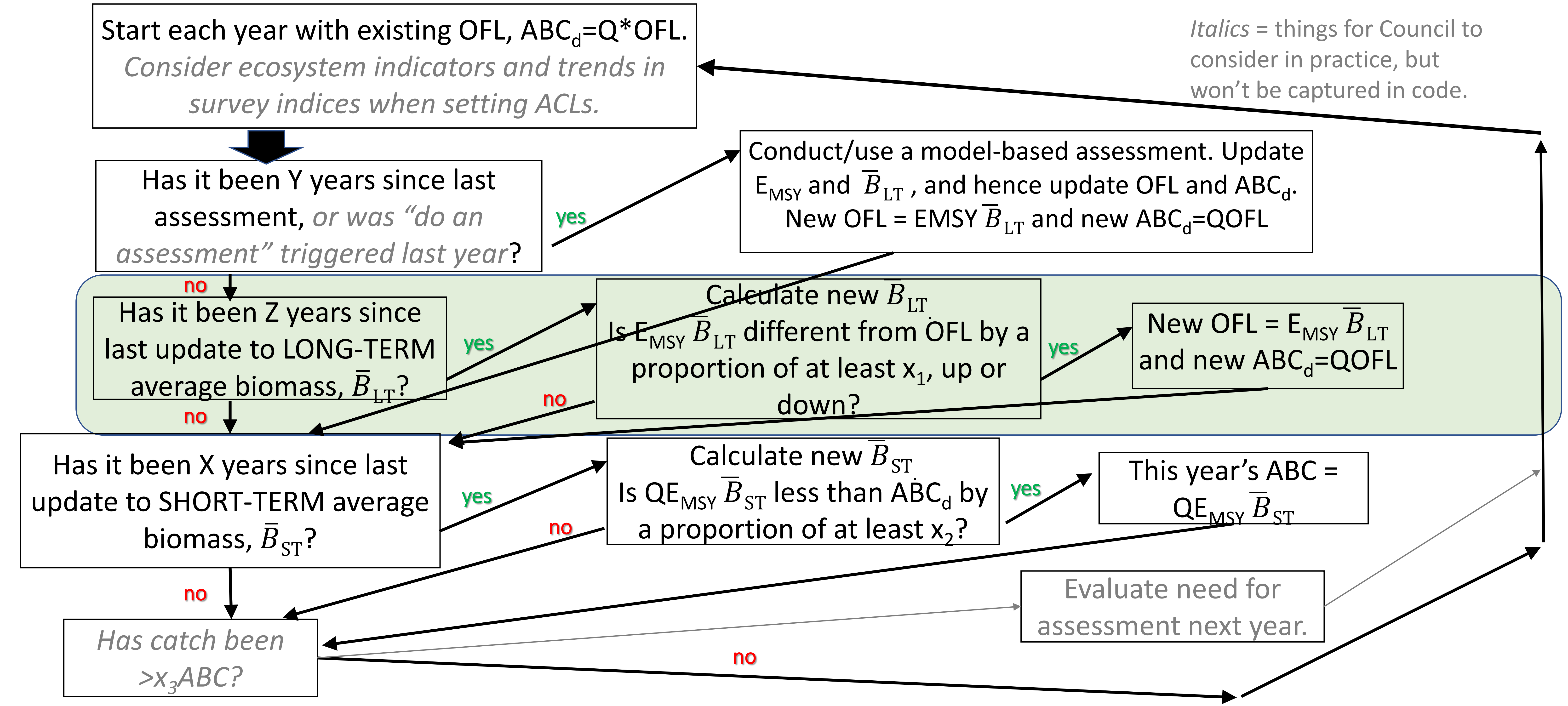
Has it been Y years since last assessment, *or was "do an assessment" triggered last year*?

→ yes →

Conduct/use a model-based assessment. Update E_{MSY} and $\bar{B}_{LT}$, and hence update OFL and ABC_d. New OFL = EMSY $\bar{B}_{LT}$ and new ABC_d=QOFL

Stock is on long-term management:
New assessments are done every Y years which is the least frequent management action.

Clock counting years resets to 0 with New Assessment



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Management Action in Flowchart Framework: Evaluate LONG-TERM Biomass from Survey at interval Z

Example: the LONG-TERM BIOMASS from Assessment is 400,000 mt, default OFL = 95,600 mt and default ABC = 23,900 mt

Has it been Z years since last update to LONG-TERM average biomass, $\bar{B}_{LT}$?

yes →

Calculate new $\bar{B}_{LT}$. Is $E_{MSY}\,\bar{B}_{LT}$ different from OFL by a proportion of at least x_1, up or down?

yes →

New OFL = $E_{MSY}\,\bar{B}_{LT}$ and new ABC_d=QOFL

$\bar{B}_{LT}$	$E_{MSY}\bar{B}_{LT}$	OFL_d-$E_{MSY}B_{LT}$	Proportion difference	x_1	New OFL and ABC_d?	OFL	ABC
425,000	101,575	-5,975	0.06	0.10	no	95,600	23,900
450,000	107,550	-11,950	0.13	0.10	yes	107,550	26,888
375,000	89,625	5,975	0.06	0.10	no	95,600	23,900
350,000	83,650	11,950	0.13	0.10	yes	83,650	20,913
450,000	107,550	-11,950	0.13	0.20	no	95,600	23,900
500,000	119,500	-23,900	0.25	0.20	yes	119,500	29,875
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How many years of survey results are averaged for $\bar{B}_{\mathrm{LT}}$?
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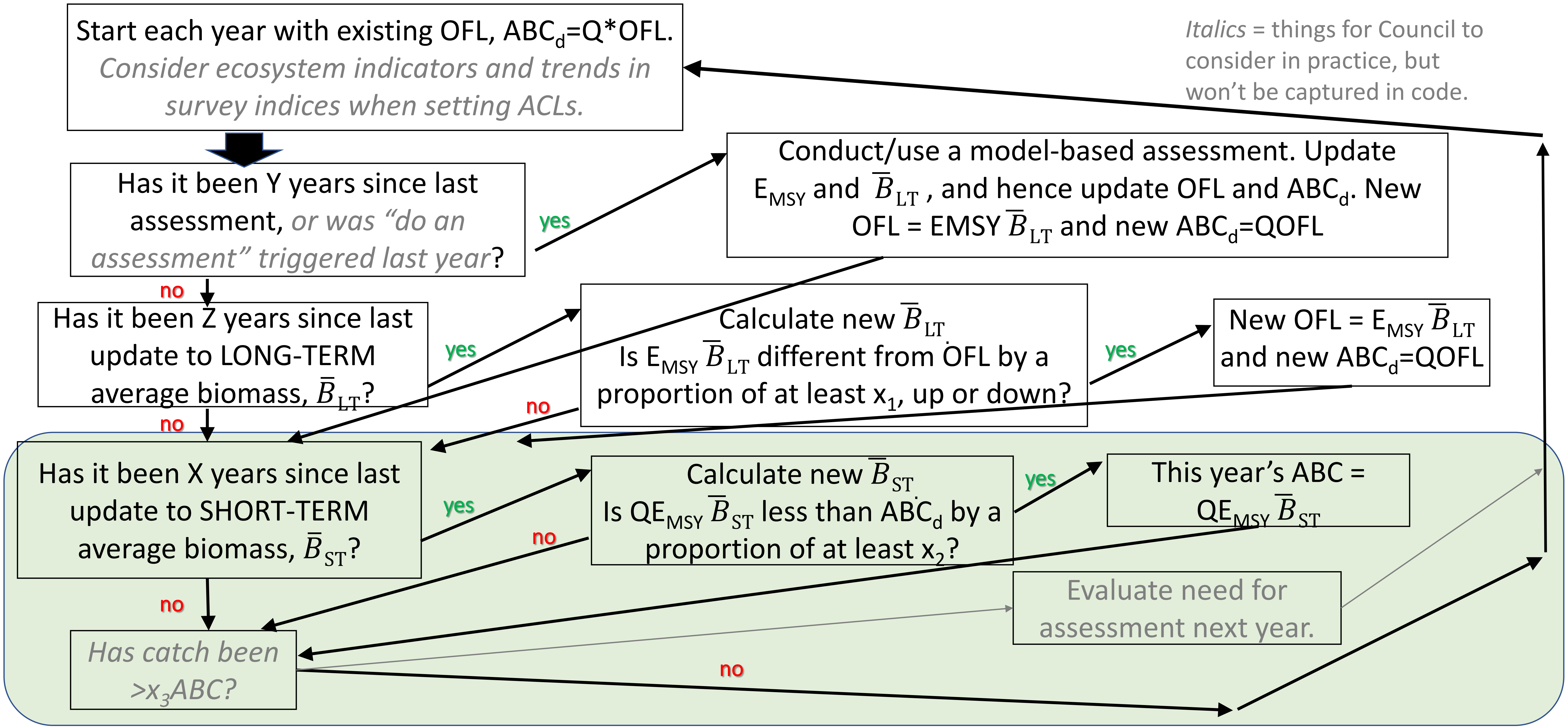

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yes →

Calculate new $\bar{B}_{ST}$
Is $QE_{MSY}\,\bar{B}_{ST}$ less than ABC_d by a proportion of at least x_2?

yes →

This year's ABC = $QE_{MSY}\,\bar{B}_{ST}$

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325,000	19,419	4,481	0.19	0.20	no	23,900
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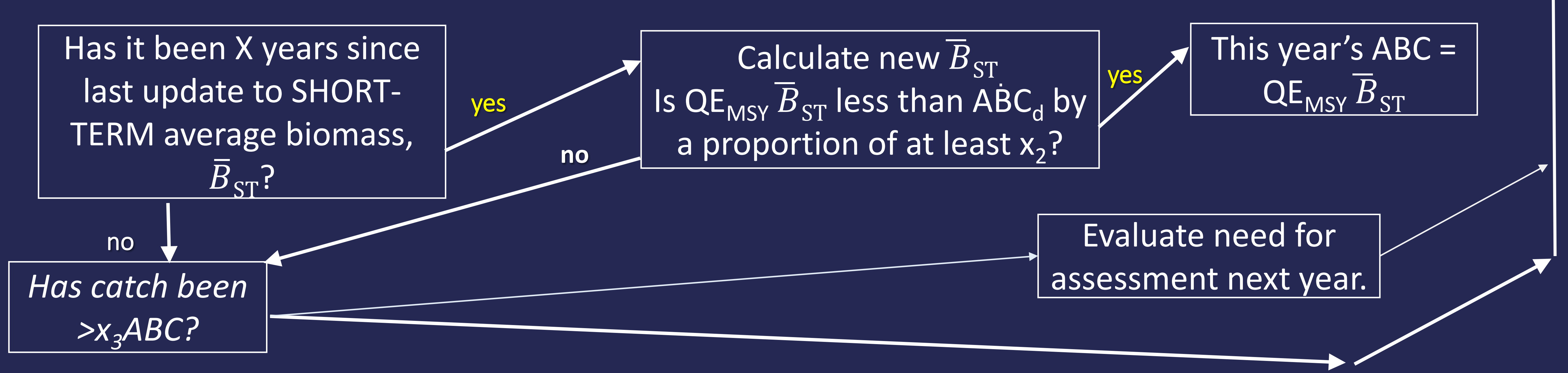

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Needs to be specified beforehand.

Outcomes of the 3-4 October CSNA Workshop

Part 3a: Recommendations for further work

Part 3b: Results of follow-up work and trade-offs

3a. Key Conclusions/recommendations:

- The flowchart represents an appropriate way to structure decision making for when (and how) to update OFLs and ABCs.

- The analysis conducted for the meeting was insufficient to provide conclusive recommendations for the frequency of OFL and ABC updates (and other associated parameters).
- Additional analyses (ranges of parameters - Table 5 of the report) were specified to provide the Advisory Bodies the ability to take a deeper look at the trade-offs (Attachment 2).

Image: NOAA Fisheries

3b. Trade-offs:

- The analysis is MSE-like but does not include two key features:
  - No attempt is made to account for ACLs.
  - The catch is assumed to equal the ABC (which has not been the case since the early 1980s).
- The analysis is based on life history and stock-recruit dynamics as understood from the 1995 assessment.
- Results are shown when there is a cap on the catch, but this is part of the evaluation and not a suggested policy.

Metrics to compare options:

- Probability of overfishing
- Probability of being overfished
- Probability ABC is less than 25,000t, 10,000t, and 5,000t.
- Plots to evaluate variation in ABCs and OFLs

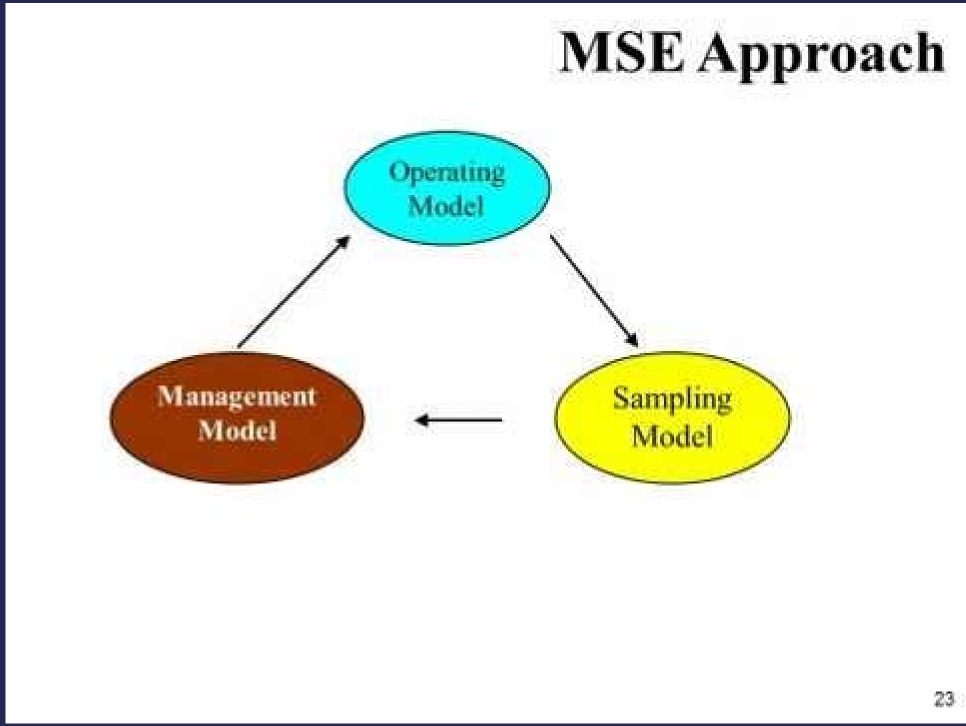
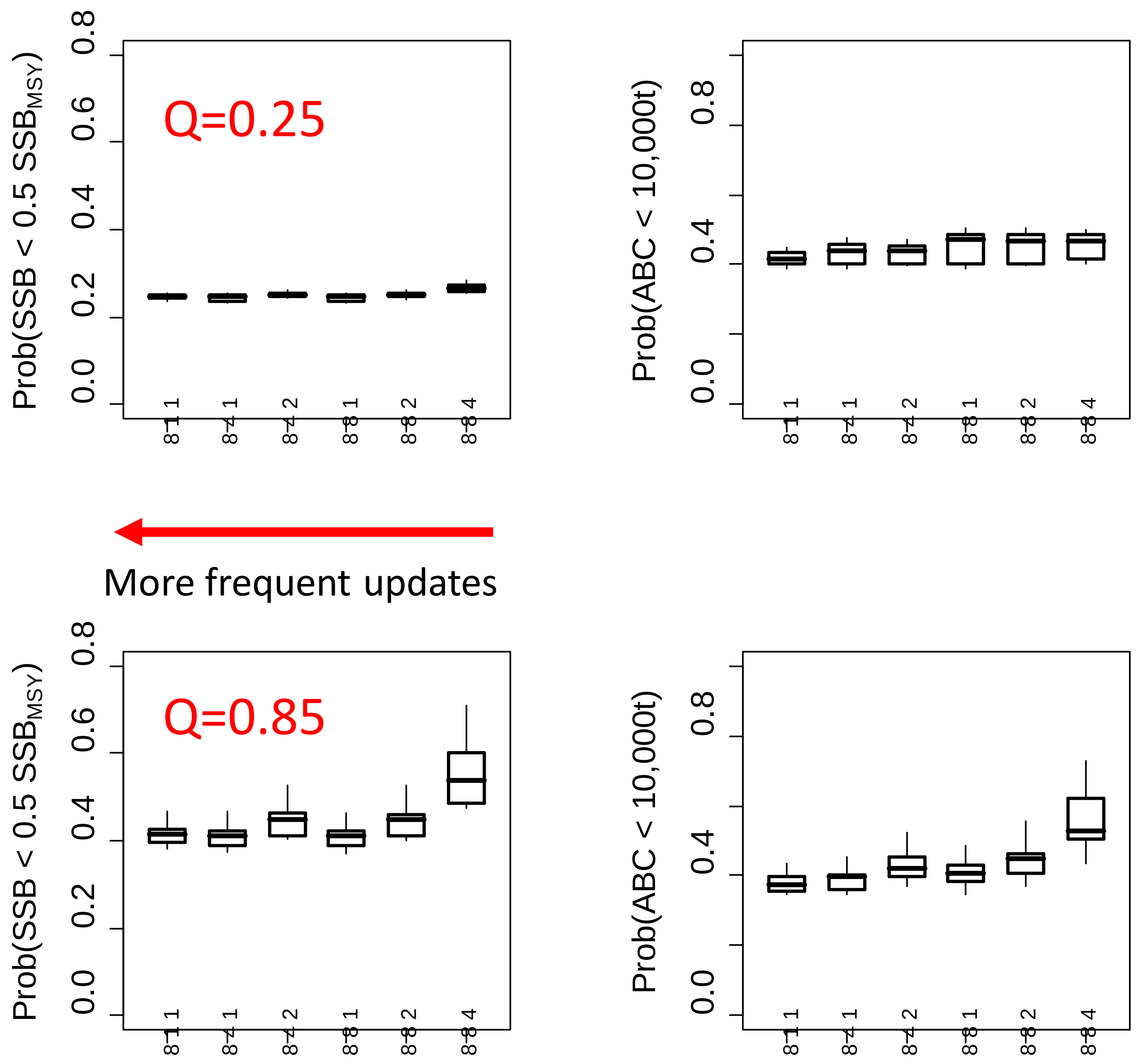


Image: NOAA Fisheries

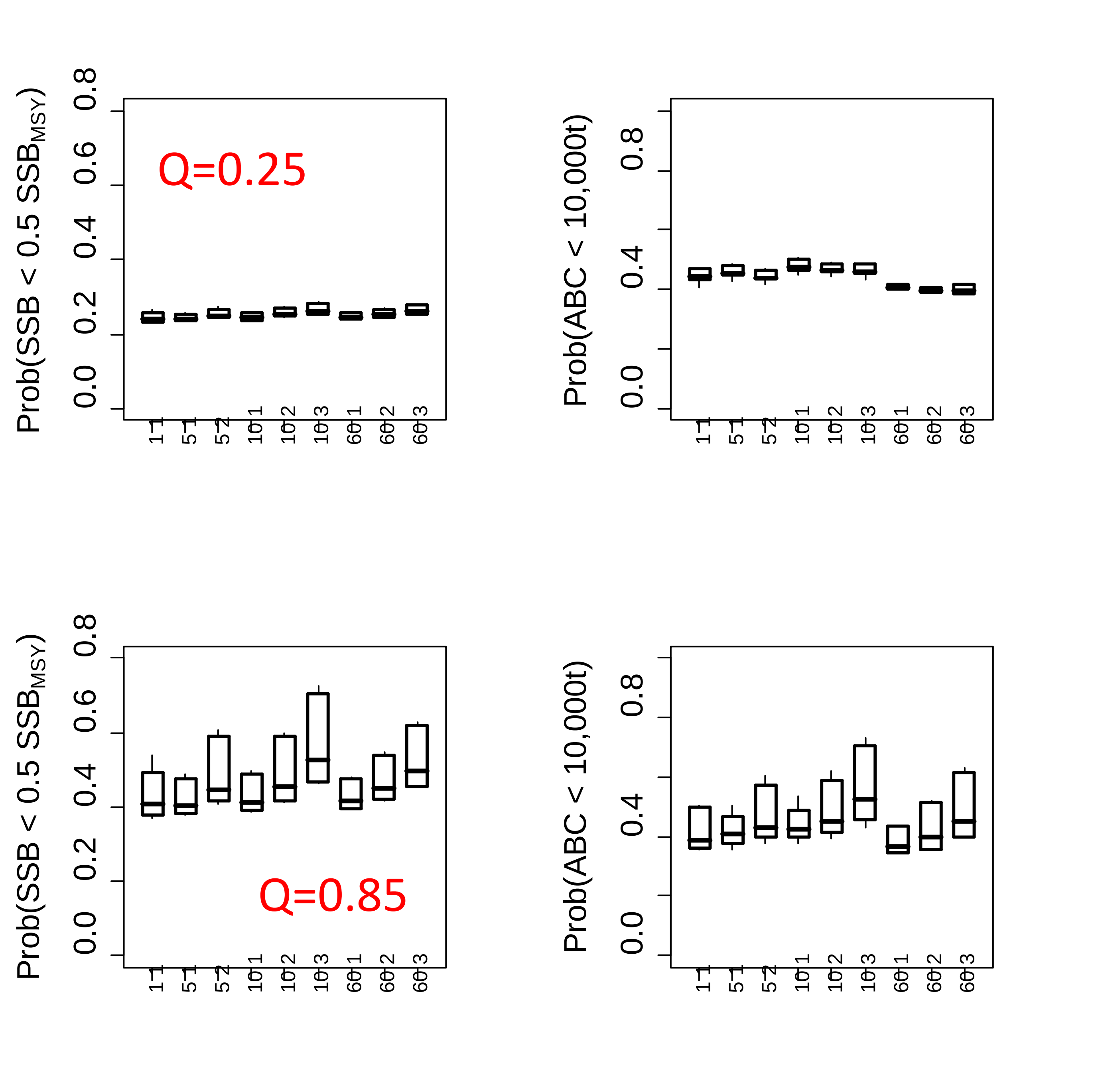
The key trade-offs are:

- Frequency and how often OFLs and ABCs are changed (to response to changed conditions):
  - More frequent – ability to respond quickly but perhaps subject to “following noise”.
  - Less frequent – more stability.
  - Results are insensitive to the frequency of assessments.



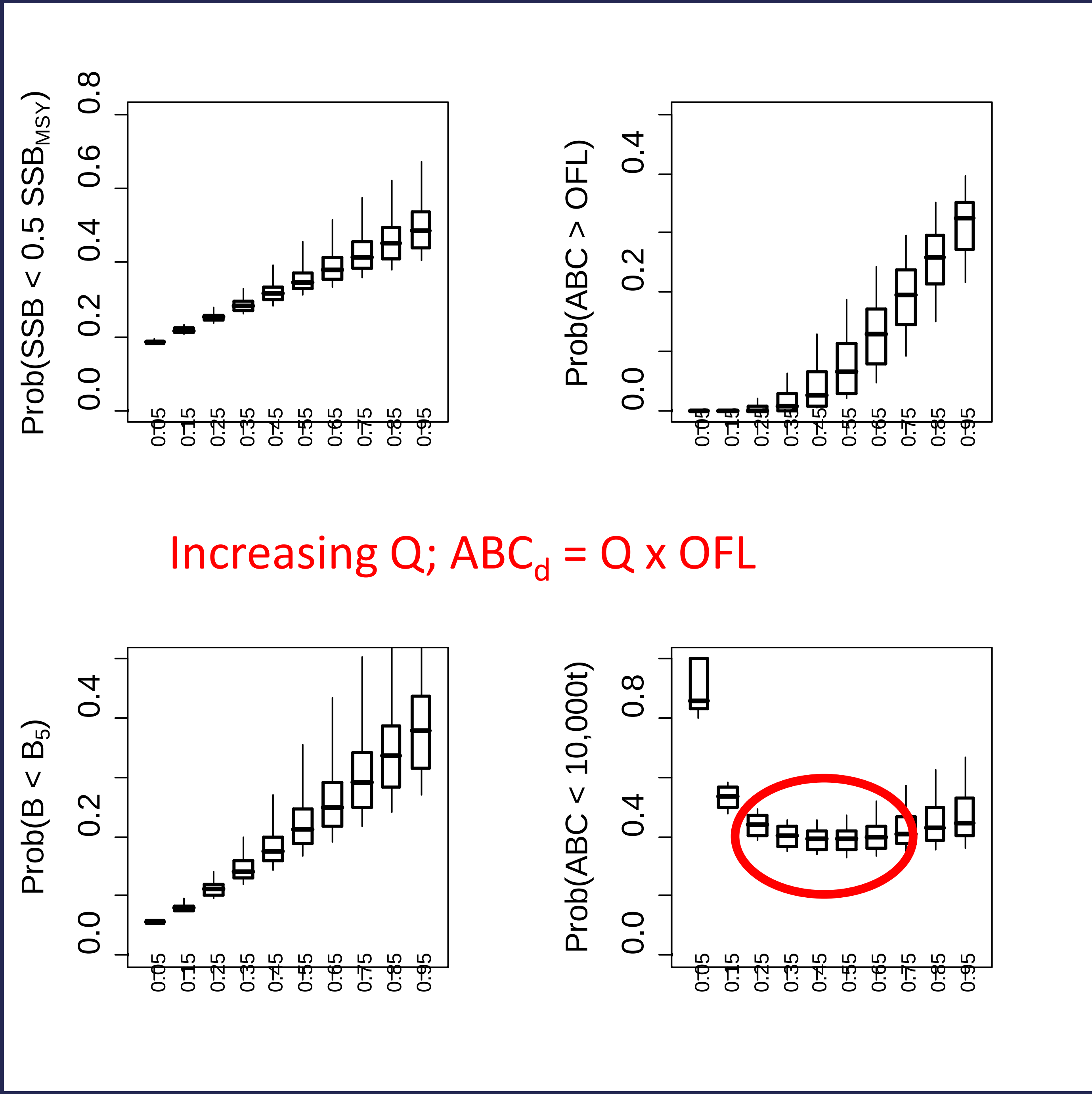
The key trade-offs are:

- The number of years over which long- and short-term biomass are defined (1, 5, 10 60 years; 1, 2, 3) :
    - The values for the performance statistics are lowest (best) when short-term biomass is defined by the most recent estimate but performance is better when the long-term biomass is based on at least 5 (5, 10 or 60) rather than 1 years.



The most influential parameter is Q (the factor that relates OFL to ABC; ABC = Q x OFL):

- Lowest values for Q perform poorly for ABC
- Higher Qs correspond to higher risk
- The probability of an OFL below 10,000t is higher for both low and high values of Q.
- MAXCAT (if implemented) reduces the negative effects of higher values for Q.



Overall summary of trade-offs:

- To get lower risk and lower probability of ABC < 25,000t, 10,000t:
  - more frequent OFL and ABC updates; and
  - short- and long-term based on shorter intervals (except long-term biomass based on one year leads to higher risk).
- The values of x_1 and x_2 are largely inconsequential; larger values will lead to fewer changes in ABCs and OFLs (but larger changes when they take place).
- The value for Q (“the buffer”) has the largest impact on all performance metrics.
- **Note:** No account is taken of the impact of:
  - the variability in ABCs / OFLs;
  - how ACLs might be set given ABCs and OFLs; and
  - the ability of industry to take the ACL (ABC in this case).