

The SSC Ecosystem working group had its initial meeting 4 August 2021. Group members include Sarah Gaichas (appointed chair), Geret DePiper, Gavin Fay, Dave Secor, Mike Wilberg, Rob Latour, Wendy Gabriel, Yan Jiao, and Paul Rago. Brandon Muffley facilitated the meeting, and several Northeast Fisheries Science Center (NEFSC) Ecosystem Dynamics and Assessment Branch staff listened in: Scott Large, Sean Lucey, and Andy Beet.

The SSC ecosystem working group was established to assist the Council in developing short term and long term objectives to advance the operational use of ecosystem information in management decisions. This information can include, but is not limited to, the information already provided in the NEFSC State of the Ecosystem (SOE) reports. The SOE indicator data¹ and methods² are publicly available. The NEFSC is currently developing prototype stock-specific ecosystem data³ and reporting capability which can be tailored to needs identified by the Council and SSC.

The group first identified multiple science and management decisions and processes that could be supported by ecosystem information (Table 1). The SSC can advise on some processes, and has full control over others. This is a consideration in prioritizing short and long term tasks for the group.

Table 1. Management and science entry points for ecosystem information

Primary decision maker	Process
SSC	Existing stock level OFL CV (expand/clarify ecosystem information criteria for uncertainty bins)
SSC	Develop new processes to provide multispecies and system level scientific advice (e.g. evaluating ecosystem overfishing reference points, identifying tradeoffs between fisheries across a range of management alternatives as climate changes, etc.)
Council staff	Stock or issue level NEPA analysis (EA/EIS development) or other fishery information documents. (SSC could provide guidance on ecosystem information Council staff can provide in relevant fishery documents.)
Council	Strategic planning; develop and coordinate stock, multispecies, fishery management plan, and system level research priorities
Council	Further development of EAFM process (e.g. refine indicator-based risk assessment methods)

¹ <https://github.com/NOAA-EDAB/ecodata>

² <https://noaa-edab.github.io/tech-doc/>

³ <https://noaa-edab.github.io/ECSA/index.html>

NRCC	Developing stock assessment ToRs (identify and incorporate relevant ecosystem-linked ToRs). (The SSC can work with NEFSC to improve specification of the Ecosystem ToR in Research Track assessments and encourage development of stock-specific ecosystem reporting).
NEFSC/scientific collaborators	Stock assessment (identify and incorporate relevant ecosystem data); identify potential research priorities to support Research Track assessments. (The SSC can work with NEFSC to improve specification of the Ecosystem ToR in Research Track assessments and encourage development of stock-specific ecosystem reporting).

The SSC ecosystem group agreed that envisioning a desired final product/process is important for outlining tasks to achieve that objective.

We propose that one high priority short term objective is expanding and clarifying the ecosystem portion of the SSC OFL CV determination process. This process is fully under the purview of the SSC and a natural extension of previous work improving the transparency and reproducibility of the OFL CV process in general. It does not require developing a brand new framework. Further, it directly affects ABC.

If the SSC clearly specifies a set of criteria for using ecosystem information as part of OFL CV determination, this serves at least two purposes.

1. First, clearly specified criteria will facilitate the development and testing of ecosystem indicators useful to SSC OFL CV decisions independent of the stock assessment process. The SSC already considers information relevant to the stock but not necessarily included in the assessment under this criterion (e.g. stock climate vulnerability). This is an opportunity to clarify specific ecosystem information most relevant to scientific uncertainty (and bias, in the case of nonstationary ecosystems) in setting ABC, and to highlight appropriate data streams and indicators, including any multispecies and system level indicators that are difficult to address at the individual stock level.
2. Second, by defining these criteria surrounding scientific uncertainty in detail, the SSC could provide information on what type of ecosystem ToRs might be appropriate for stock assessments and what type of ecosystem information might be prioritized for inclusion in stock assessment models. For example, the group discussed several proposed clarifications of the ecosystem OFL CV criteria that involve stock assessment parameters and inputs which may be affected by ecosystem processes (e.g. predation impacts on M, ecosystem productivity impacts on weight at age). Therefore, establishing OFL CV criteria for ecosystem considerations may also inform multiple management decisions and processes identified by the SSC work group, even though the SSC is not the primary decision maker in these processes.

Under this short term objective, the SSC ecosystem group would first outline a set of hypotheses for which ecosystem factors would be reasonably expected to affect uncertainty in OFL for a range of life history types or selected individual stocks. A conceptual model mapping ecosystem factors to stock attributes and stock assessment components directly affecting OFL would be constructed to focus on the most relevant considerations for OFL CV. NEFSC staff (EDAB and others as appropriate) would match the ecosystem factors to existing ecosystem indicators, or identify information to develop new indicators if necessary. The SSC ecosystem work group would then collaborate with NEFSC staff to develop analyses relating changes in selected ecosystem indicators to increases/decreases in OFL uncertainty for general life history types, individual stocks, or both. Coordination with specific upcoming research track assessments is also possible.

We propose a longer term objective of developing prototype processes to provide multispecies and system level scientific advice appropriate for Council decision making, in particular where there are multispecies and multifleet tradeoffs linking directly to economic and social outcomes. This is obviously more complex, and requires collaborative work with the Council and Council staff to identify initial priorities with concrete endpoints. One suggestion from the work group was to evaluate thresholds across multiple indicators that, if crossed, might cause the Council to reconsider broad management objectives at the FMP level or across FMPs. Another suggestion could be to address ecosystem productivity comprehensively across stocks in estimation of reference points and approaches for short term projections as well as rebuilding plans.

Additional work is needed in specifying stock-specific Ecosystem ToRs that are impactful and can be integrated into assessments. We propose a moderate-term objective of having the Ecosystem work group and species lead work with NEFSC stock leads and the NEFSC Ecosystem Dynamics and Assessment Branch to nominate one or two Ecosystem considerations for upcoming research Track assessments, from which an Ecosystem ToR can be formulated. This process should be coordinated with developing stock-specific ecosystem reporting (ESP) approaches at NEFSC.

The SSC ecosystem work group looks forward to working collaboratively with the Council, Council staff, NEFSC, and other groups to refine and update these tasks. We are eager to proceed towards the common goal of supporting and improving management by incorporating targeted and appropriate ecosystem information (including climate, habitat, ecological, social and economic information) into decision processes.