

## End-to-end food webs

- Session 1. Background concepts and issues
- Session 2. Key issues in e2e food web analyses
- Session 3. End-to-end operation of regional ecosystems
- Session 4. Modelling approaches to develop end-to-end food web analyses
- Session 5. Field programmes, observations and experimentation for end-to-end food web analyses

## End-to-end food webs

### Session 1. Background concepts and issues

Q. What is an end-to-end food web?

A. ...incorporates the influences of ocean physics and chemistry into the total feeding interactions, nutrient flows and feedbacks among primary producers, consumers and decomposers over a range of time and space scales

## End-to-end food webs

### Session 2. Key issues in e2e food web analyses

Q. What are the key issues to consider in end-to-end food web analyses?

- trophic controls (e.g. top-down, bottom-up, mixed)
- model objectives in relation to model complexity
- multidisciplinary research difficulties
- emergent properties of food webs/ ecosystems
- scales - key issue
- theoretical context important (matching models and data)
- characterization of extremes
- move between specific and generic models/ approaches
- uncertainty of outcomes should be explicit
- comparative analyses required
- crisp goals needed, especially when scaling up and down
- need for case studies

## End-to-end food webs

### Session 3. E2E operation of regional ecosystems

Q. What are the common features and major differences in regional food webs?

- structure varies spatially and temporally
- difficulties of combining bgc-, trophic- and resource exploitation-models
- consequences of model complexity and error accumulation on the reliability of model simulations
- existing E2E models do not adequately address plasticity of responses
- deterministic approaches don't allow resolution of emergent ecosystem properties
- build models focused on basic principles ♦ - usefulness of generic versus system-specific model
- ecosystem and species-specific stressors that are the drivers for regime shifts

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- existing E2E models do not adequately address the plasticity of response
- deterministic approaches don't allow resolution of emergent ecosystem properties.
- build models focused on basic principles ♦ - usefulness of generic versus system-specific model
  - What are ecosystem and species-specific stressors which are the drivers for regime shifts?

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### Session 4. Modelling approaches to develop end-to-end food web analyses

Q1. What are the modelling approaches for e2e food webs?

Series of presentations linking bgc to food webs: e.g.

- 1) two-way coupling among circulation, bgc and ecosystems models (oceanic)
- 2) bgc to fish model - wide application in many regions (coastal to oceanic)
- 3) first principles - e.g. emergence of phytoplankton species
- 4) circulation, bgc and trophic model (coastal)
- 5) meta-models using rules and states rather than equations and variables (fisheries-ecosystem)

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### Session 4. Modelling approaches to develop e2e food webs

Q2. What are the difficulties and ways forward in modelling?

- have come a long way during the last few years.
- food webs are not static - important to consider scaling issues and focus on climate change and physiological effects
- stoichiometric approach - consider each species as a bgc pool.
- modelling should be linked to the analyses of data and help drive data collection.
- multidisciplinary teams - find ways to ensure this works.
- large scale model efforts - focus on regional models rather than large-scale general models...
- ...but, complex large-scale models help to understand the general processes involved – the model is idealized reality
- we need to be able to test model performance - set of metrics

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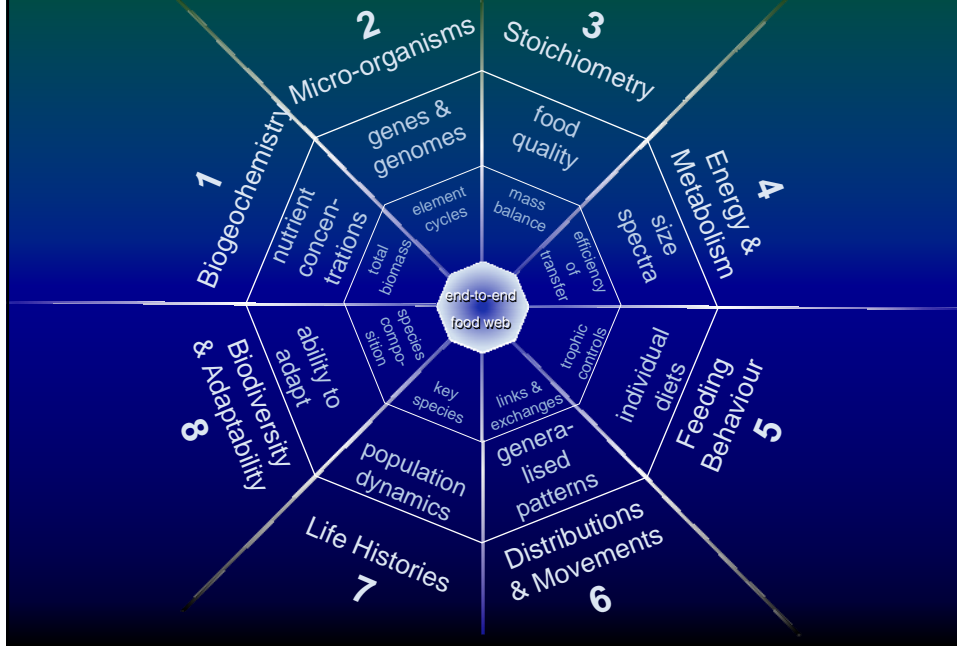
### Session 5. Field programmes, observations and experimentation for end-to-end food web analyses.

Q. How might end-to-end food web approaches be incorporated into field programmes, observations and experiments?

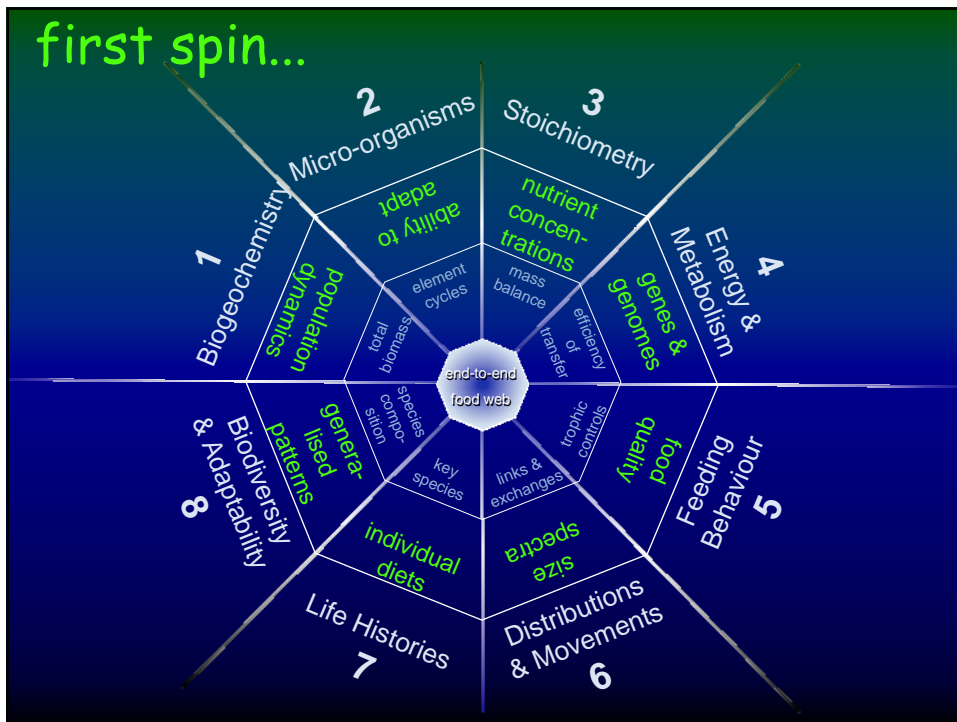
- focus on lower trophic levels in the discussions
- considered the kinds of data required for models
- need for consistency between the variables we measure and those used in models
- need common sets of variables with common units for comparative studies
- there are ongoing discussions in breakaway groups to recommend ways forward...



choose a category (1-8)...



first spin...



# second spin...

