# Unit 5. Emergent approaches

## Reading assignments

| Date | Reading | Due |
|------|---------|-----|
| Tuesday, Apr. 5 | Walker & Salt I: pages 1-52 (chs. 1 & 2) | Reading reaction |
| Thursday, Apr. 7 | Walker & Salt II: pages 53-95 (chs. 3 & 4) | Reading reaction |
| Tuesday, Apr. 12 | Walker & Salt III: pages 111-154 (chs. 5 & 6) and Nheta (handout) | Reading reaction and **paper outline** |
| Thursday, Apr. 14 | Shirky I: pages 1-39 | Reading reaction |
| Tuesday, April 19 | Shirky II: pages 39-54 & 260-292 | Reading reaction and **paper 1st draft** |

Note that your **paper final draft** is **due 28 April**; on the same day, you will be making a **short (3-5 minute) presentation** to the class.

## Learning objectives

1. Be familiar with the application of resilience ideas to sustainability (Walker & Salt).
   a) Define resilience.
   b) Describe some of the pros and cons of the optimization approach.
   c) Explain what is meant by *linearity* in the context of resilience science.
   d) Describe the paradox of efficiency and optimization.
   e) Give examples of key slow variables and sudden disturbances in the Everglades and in the GBC (Goulburn-Broken Catchment).
   f) Describe factors that make behavior of complex adaptive systems hard to predict.
   g) Explain differences between the notions *steady state* vs *equilibrium*.
   h) Explain the positive feedback processes associated with sediment phosphorous, lake water phosphorus, and eutrophication in the hypothetical lake model.
   i) Define hysteresis in the context of resilience science.
   j) Explain the difference between *ecological resilience* and *engineering resilience*.
   k) Explain the difference between *functional diversity* and *response diversity*.
   l) Reproduce the iconic sketch of the adaptive cycle (page 81) and explain how its components are related to the simplified representation (page 82).
   m) Describe some dangerous characteristics of the late-K phase.
   n) Explain why Walker and Salt advocate a graceful passage through the back loop.
   o) Define *panarchical* in the context of resilience science.
   p) Describe which parts of an adaptive cycle are likely to be incremental and predictable, and which are not.
   q) Define *adaptability* (or *adaptive capacity*) as it is used by Walker and Salt.
   r) Describe pros and cons of *feedback tightness* and *modularity* in the context of resilience science.

2. Be familiar with emergent properties of new social tools (Shirky)
   a) Describe general characteristics of Raymond's plausible promise, and how Evan Guttman's message qualified as one.
   b) Describe the gap that lies at the heart of Shirky's institutional dilemma.
   c) Describe how Coase's model ties together the concepts of transaction costs, markets, and the value of firms or other hierarchical organizations.
   d) Explain what is meant in saying an activity lies below a Coasean floor.
   e) Explain how user-generated labeling (e.g., Flikr) reduces transactional costs.
   f) Describe how lowered transaction costs make possible projects that were previously unavailable (in a Coasean way); divide your response into the categories of *sharing*, *cooperation*, and *collective action*.
   g) Describe social dilemmas that lead to failure of groups, according to Shirky.
   h) Describe two ways societies have generally dealt with abuse of the Commons.
   i) Describe two essential characteristics of the Watts/Strogatz Small World network.
   j) Describe Shirky's paradox of groups.

3. Be familiar with emergent properties of new social tools (Shirky)
   a) Interpret given power law distribution functions.
   b) Carry out power law distribution calculations.