Goals – to reinforce key points from the lectures, and to encourage quantitative thinking.

- Fill in Name (Last, first) and student number at the top of all pages, and staple pages together.
- Space indicates expected length of answer, but if you need more space, add extra pages with name and student number at the top, indicating which question you are doing.
- HANDWRITE your answers, show your workings, use metric units, give answers to a reasonable number of significant figures and do your best to make your paper clear and easy to read.
- Although you may discuss the questions with others, complete the homework on your own.

**Question 1 - Bering Sea.**

1a) Describe 2 processes that increase the winter extent of sea ice in the Bering Sea.

1b) Describe 2 processes that decrease the winter extent of sea ice in the Bering Sea.

1c) What is the Pacific Decadal Oscillation?

1d) For each sentence, circle the option (*) which makes the condition correct for a COLD year in the Bering Sea:

- Strong/weak* southward winds in winter.
- Early/late* sea-ice retreat.
- Early/late* phytoplankton bloom.
- Phytoplankton bloom in cold/warm* water.
- Stratification for bloom provided by salinity/temperature* of water.
- Advantageous/non-advantageous* for pelagic communities.
- Advantageous/non-advantageous* for benthic communities.
- Favors small/large* copepods.

1e) As used by fisheries research, what is meant by the term “recruitment”?
f) As used by fisheries research, what is meant by the terms i) year-class and ii) Age-1?

1g) Describe 3 factors that lead to a strong recruitment of Pollock.

1h) Describe 3 factors that lead to a poor recruitment of Pollock.

**Question 2: Arctic Megafauna.**

2a) What is meant by the term “ice obligate”?

2b) Name 2 Arctic “ice obligate” species.
2c) What is meant by the term “ice associated”?

2d) Name 2 Arctic “ice associated” species.

2e) Describe 2 factors threatening the pacific walrus as Arctic sea ice retreats.

2f) Describe 2 factors threatening the polar bear as Arctic sea ice retreats.

2g) Describe 2 factors threatening the bowhead whale as Arctic sea ice retreats.
Question 3: Causes of Arctic sea ice retreat.

/9pts Describe 3 physical factors that could result in Arctic sea ice retreat. For each, give a reasoned explanation as to why the factor will become more important/less important or remain of the same importance as Arctic sea ice thins.

Extra assignment for 3 credit option (10 pts).

Consider the following paper:

http://faculty.virginia.edu/berg/journals/modeling/Ray%20et%20al%202006%20MBE.pdf


The assignment is the usual, viz: prepare (in your own words) a ~ half page (~ 500word) summary of the main findings of the paper. This summary may be handwritten or typed. This paper is much longer than prior assignments. Concentrate your effort on the abstract, and sections 1 and 2, but include a short description of at least one of the ecological effects discussed in section 3.