

## Fisheries Management Plan Assignment

The purpose of this assignment is to develop a management plan for that fishery that will direct activities for the next ten years. A fishery management plan falls into three major tasks. First, you will design and lead the sampling on a water body. Second, you will analyze the data you collect, including performing a number of statistical and fisheries related quantitative analyses. This includes reviewing the literature to find possible problems and actions. Third, you will develop your management plan, which you will present orally during a stake-holder meeting and in a written report.

You will be assigned to a team of 3-5 students. Your team will be assigned a particular lake or river we are sampling this fall. The team will work together in preparing for sampling, data analysis, and developing a management plan, and presenting the plan to the class. Be sure to listen to your team! Some people might have different ideas, and all might be correct. Team members should explore all options, with some members playing “Devil’s Advocate” to consider all possibilities.

### General procedure

#### Sampling:

- You will be assigned to a group and each group will be responsible for a water body.
- You will design a sampling protocol and determine what equipment is required. You will be responsible for obtaining all the equipment and getting it ready for our field trip.
- In addition, you will be required to clean and return all equipment when sampling is finished.
- You will be in charge of the sampling. Watch and make sure you think it is being done correctly!
- MAKE SURE to write down ALL necessary data (dates, times, number of fish, units, etc.). If you don’t write down ALL information, some data may become useless.

#### Data analysis:

- Your team will enter all the data into an Excel spreadsheet. You must follow the format provided in the spreadsheet. You can sub-divide the data so each person enters only a portion, but you will need to put it all together into one file in the end.
- Students may work together on the data analyses, but make sure you understand how to do them yourself!
- You should generate data summaries, trends, graphs, and statistics documenting the change (or lack of change) in the lake. Play around with the data – make lots of graphs to help you find interesting trends. Making graphs also is a good way to find errors in the data – look for outliers and try to determine if there was an error or if it is the correct value. ASK before deleting data!
- Find out what you can about your water body: look at topo maps (topozone.com) and/or aerial photography (e.g., maps.google.com) to characterize the surroundings of the water body.
- You must turn in an excel file that shows that you did the following calculations (or provide a brief explanation why the data did not allow a particular analysis):
  - Average length and weight of individual species
  - Total number caught and average catch rates (CPUE)
  - Use actual or estimated ages to calculate length-at-age and compare to state average
  - Mortality estimates for key species
  - Population estimates for key species
  - Relative weight
  - PSD, RSD and/or Y:C
  - Temporal trends (I will provide data summaries from previous sampling) with statistics and/or tic-tac-toe graphs
- You must submit your entire Excel file with your calculations on 8 November (50 pts.)

The plan:

- Decide on your management objectives, considering all users and what is realistic. This is where you may discuss things as a group, but different people might have different ideas.
- As a group, you will give a presentation (30 pts.) of your plan in a meeting with the HSC.
- Individually, you will write a draft management report (25 pts.) that will be peer reviewed (25 pts.) before the final version is submitted (100 pts.).
- In total, this assignment is worth 22.5% of your grade for the class. Take the assignment seriously and do a complete and thoughtful job on your management plan. **I cannot emphasize the importance of following format instructions and including statistics and metrics** discussed in your book and in class.

### The management report

- Your report must be at least 5 pages of text (more likely it will be longer), double-spaced, in 12 pt. times or times new roman, with 1" margins. A title page (optional), figures, tables, and literature cited **do not** count toward the total page count.
- You must include **at least five peer-review references** in your paper. **No web references!** Agency reports may be cited, but they do not count towards your five references. Look for papers about the problem in your lake (e.g., introduced predators), potential solutions (e.g., liming), or the requirements for the species you are managing for (e.g., habitat requirements for yellow perch).
- You **MUST** have at least TWO unique references from your teammates.
- See the guide to authors for Transactions of the American Fisheries Society for correct formatting of citations, references, and various abbreviations. It is posted on my web site (under "Classes").
- **DO NOT** use English units. Convert everything to metric (unless you mention a length limit, in which case you should use both English and metric units).

Your paper must include these sections (sections in italics, with descriptions in regular text):

- a) *Goal (usually a single, short paragraph)*
  - i) Your long-range vision of the future management goals for the water body
  - ii) Cover only the main goal (e.g., changing pH to make a better sport fishery means your goal is a better sport fishery – changing the pH is only a means to achieve this goal and should not be mentioned in this section)
- b) *Analysis of Resources (usually several paragraphs)*
  - i) The physical, chemical, biological, and social attributes
  - ii) Think of this section as being similar to a results section in a scientific paper
  - iii) Present the system (kind of like a “study site” section, but don’t use that as a heading)
  - iv) Discuss the history of the system including an overview of how and when it was sampled
  - v) Present trends and current status using all appropriate metrics we discussed in class
  - vi) Cite tables and figures as appropriate
- c) *Diagnosis of Problems and of Potentials (a paragraph or two per topic)*
  - i) Identify the problems and present potential solutions
  - ii) Think of this as a “discussion” section
  - iii) Use citations that show what methods have worked elsewhere and specifically what methods were used
  - iv) If you describe the methods, and support the methods should work by providing citations, the next sections are very simple to write
- d) *Management Objectives and Actions (often bulleted or numbered, keep it brief)*
  - i) Set **quantifiable** objectives (i.e., what value or range are you shooting for?)
  - ii) Each objective should relate to a resource problem identified in the previous step

- iii) Prescribe one or more management actions to achieve each objective
- iv) Can be presented using bullets or numbered lists (i.e., does not have to be paragraph form)
- v) For example:
  - Objective 1: Increase mean size of burbot to 350 mm
  - Action 1: Improve forage base by adding 1,000 emerald shiners in the first spring
  - Action 2: Implement a minimum size limit of 300 mm
  - Action 3: If emerald shiners are not found after the stocking, stock 1,000 fathead minnows
- e) *Evaluation and maintenance (a paragraph or two about monitoring and updating)*
  - i) Describe how will you assess the success of your actions (this means survey plans)
  - ii) Include any plans for revisions or additional actions (these alternate actions need only be suggested and do not have to be described in detail)
- f) *Management Timeline (usually a graphic or table – not a written paragraph)*
  - i) A brief summary of the timing of actions, evaluation, and maintenance
  - ii) This is best presented using timelines, tables, or figures
  - iii) Do not have an unrealistic timeline (e.g., it is hard to resample the same water body every year for 10 years for most agencies)
- g) *Resources required (hard to write as a paragraph, better as a table with caption)*
  - i) Briefly describe the needs for effort and resources
  - ii) **This should cover general items only** and will help you think about if your plan is realistic (i.e., say four fyke nets, not fyke nets, anchors, lines, measuring board etc. – the extras are obvious)
- h) *Literature cited*

Your management report will be graded on format, grammar, and clarity (25 pts.), following the management process and making logical recommendations (30 pts.), using data to support your plan (30 pts.), and using literature to support your plan (15 pts.). See rubric on the course web site.

### **Tables and figures**

- Tables and Figures must come at the end of the text and should be referred to by number (Figure 1, Figure 2, Table 1, etc.). DO NOT embed figures or tables in the text!
- DO NOT use color in your figures.
- Label all axes with a suitable title, including units of measurement (where appropriate).
- Include a descriptive caption with each table or figure. DO NOT write a caption like: “Figure showing the number of largemouth bass.” Instead, the caption should read “Figure 1. Largemouth bass abundance in Mud Lake, Luce County, Michigan, from 1985-1992.”
- If you use abbreviations in the table or figure, make sure to explain them in the caption.
- SEE my tips for writing on my “Classes” web page for additional do’s and don’ts.

### **Draft report and peer review**

- If you follow the format and make a reasonable effort, you should earn all the points.
- Each student will review another students draft management report. You will be graded on how thorough your peer review is regarding spelling, grammar, format, and content. You should offer constructive criticism and suggestions for improvement.
- The peer review form MUST be turned in with your final or you and the reviewer will lose 20 pts.
- I also will review the drafts, but for content more than grammar or spelling.
- See the peer review form to get an idea of what a peer reviewer should look for (i.e., what your report should contain).

### **Oral presentation**

- You will give an oral presentation about one agreed-upon management plan.
- Each person in the group must contribute equally to the presentation and answering of questions.
- You should use visual aids (the board, power point, etc.) to make your point.
- The rest of the class will act as various interest and user groups and ask questions about your plan.
- Your presentation should be 15 minutes long, with about 20 minutes for questions.
- Your talk should follow a similar format to your written reports.
- Remember, you are trying to sell your plan to a broad range of users, so convince us why it is the right choice and why it will work!
- Show us the data, but make sure to think about speaking to a broad audience.
- You will be graded on content (10 pts.), presentation (5 pts.), and answering questions (5 pts.)

### **Management plan groups:**

To be determined...

We have two other field trips (Soldier Lake and Pendills Creek) that will be used to collect data for analysis in class. We will plan these sampling trips together and you will be assigned to help collect and prepare equipment for these trips.

### **Field Trip Dates:**

Please plan accordingly by requesting time off from work as needed and spending extra time completing work needed for other classes.

#### Soldier Lake:

Sunday Sept. 11 – set nets

Monday Sept. 12 – check nets, mark fish, weigh and measure fish

Tuesday Sept. 13 – check and remove nets, weight and measure fish

#### Hiawatha Sportsmens Club:

The Sportsmens Club will provide lodging (bedding, towels, kitchen all provided) and dinners. We will need to organize food for breakfasts and lunches (lunch in the field).

Friday Sept. 23 – set nets (leave between 1 and 2 pm)

Saturday Sept. 24 – lake sampling

Sunday Sept. 25 – lake sampling, remove nets, return equipment (return to ARL around 3PM)

#### Pendills Creek:

Tuesday Oct. 4 (leave early if possible) - electrofishing