Water Sampling Project Template

Project Summary

This project focuses on learning more about the condition of your local water resources.

Why Conduct a Water Sampling Project?

Clean water is critical for our health, the health of our communities, and the health of our ecosystems and their inhabitants. Through our watersheds all land drains to one or more waterways, and as human activities change that land, it can affect the health of our vital water resources. Learning more about the condition of your local water resources can help "connect the dots" and improve our understanding of what activities and features in your local watershed are protecting – or harming – water quality.

What Will this Project Accomplish?

The goal of your project is to be able to estimate where your local waterway stands in comparison to other water bodies, using several standards of water quality related to water chemistry and, if sampling a river or stream, the assemblage of bottom-dwelling invertebrates living on the bottom. Ideally, you will be able to shed some light on the reason(s) behind your results, even if it's only an informed guess based on your data and observations.

Impressive Quote to Use When Asked by Your Parents or Friends About the Project

→ *Water is the driving force of all nature.* (Leonardo da Vinci)

Your Project Plan

The following is a guide to assist you in your project planning. You may wish to develop your own strategy. If you follow this outline below, however, it's not necessary to fill in every box; you may want to add or modify the sections below to best help you develop your project.

Project Outline

In very basic terms, almost any CTP project can be broken down into 4 steps (below). The Project Outline will help you think through those steps.

1. Plan and organize your project
2. Collect your data
3. Analyze the data
4. Produce your final product, and share your findings with your community

Step 1. Plan and organize your project: a few basic steps

Decision 1: What's your time frame?

What, where, and when you sample will be primarily dictated by how long a time period your team has to devote to the project, and by each team member's personal schedule. For instance, do you want to wrap up the project before the end of the summer? Before the holiday season sets in? If you are the student member of the team, will you have time after school on some days to do the sampling? And if you're the adulty team member, what days in the week work best for you? There are two examples of timelines at the end of this document, one for a 3-4 week project and one for a 6-8 week project. These are not iron-clad guides, but there just to give you a feel for when things need to be done.

Compare schedules, decide on an overall timeframe and list some tentative good/bad times to work on the project.

Decision 2: What water are you sampling?

What water body do you want to sample? Is it a pond, lake, river, stream, reservoir, other? One of the main things to consider here is accessibility. Will you need permission to go on private land, or are there enough public access points to support your sampling scheme (see below)? Look at your water body on Google Maps or some other imagery. Where would be good sampling points, and will you sample from shore or will you need a canoe or boat?

Name your target water body and why you think it would be interesting to sample it. Also, list some possible sampling points.

Decision 3: What measurements do you want to take?

Most of the basic parameters are covered in the Epicollect exercise that you recently conducted: temperature, conductivity, pH, Total Dissolved Solids. CTP should be able loan you most of the equipment you'll need (see next Step).

List the parameters you want to sample here:

Decision 4: How often will you sample, and where are your sampling points?

These two considerations are paired together because, given a tight time frame, they are interdependent. The trick is to design a sampling scheme that will be feasible for you to accomplish during your project period, while still producing interesting data. This is a time management issue that will likely be a trade-off with how many sampling locations you choose. Do you want to sample a few key places more often, or cover a larger area but have fewer samples for any given point? Do you want to characterize your water body at a point in time, or (more commonly) develop a time series?

Return to your Google Maps image of your chosen water body. Pick out some sampling spots (don't forget logistical factors) and, given your schedules and the overall timeframe, how many times you might want to take samples. List your tentative sampling plan here.

Other Considerations for Project Design:

Logistics: Lack of planning can ruin an otherwise great project so don't forget to sweat the details about how you are going to get around, whether or not you need permission to access any of your sampling locations, and who is responsible for getting/keeping the gear you'll need.

Comparative studies: Instead of looking at just one water body, you might want to compare two (or more!). Are there two ponds or rivers in town that might be interesting to compare because of different surroundings, conditions, etc? Of course, adding more water bodies will have to be factored into your calculations about how much work you can do and how much time you have to do it.

Temporal studies: Many water projects will collect data over some period of time, often determined by logistics and people's schedules. But it may be that you have a time-related question to ask/answer, such as differences among seasons (this would require a longer project period), or differences before and after an event (large storms, waterside festivals, other?).

Step 2. Collect your data

The key is to be organized! You can copy, paste and revise the CTP Epicollect form for your work. Or, if you want to go Old School, prepare a data form on paper. CTP should be able loan you most of the equipment you'll need, including the water samplers and macroinvertebrate sampling gear that you used in the workshop. Nutrient sampling kits may also be available. Fish sampling is also a possibility but this requires more specialized equipment (and CTP does not have any to loan out).

In what format will you record and maintain your data? Which member of the team is going to be the keeper of the data?

Step 3. Analyze the data

Excel or some other spreadsheet program is probably the easiest and most common way to analyze your data. Some things you can do are to provide the range of values and an average value for each of the parameters at each site, and compare sites. You can plot these data as bar graphs, or maybe line graphs showing each station along the Y axis and one or more parameter along the X axis. Look at some CTP and CAP posters for examples. Do you see any patterns in the data? Maybe there are geographic trends (upstream vs downstream), temporal trends (summer vs fall), or perhaps trends related to weather or other events.

What's your plan for recording and analyzing data?

Step 4. Produce your final product

Describe how you will document your project. Some ideas: do a poster, use the Online NRCA Project Form, produce a report, do a video, create an online interactive map? And, once you're done, how will you share your findings with your community (or beyond)? Some ideas: present at a conference (CTP can help with this); give a talk to our local land trust, conservation commission, watershed group, Board of Selectmen, or other organization; write a brochure or share your poster by displaying it at the library or town hall.

What will be your final product? How will you share it and your results?

General Timelines

CTP projects vary widely in their timelines. Below is a very general Water project timeline for a project that takes 3-4 weeks, and one that takes 6-8 weeks, just to give you a place to start:

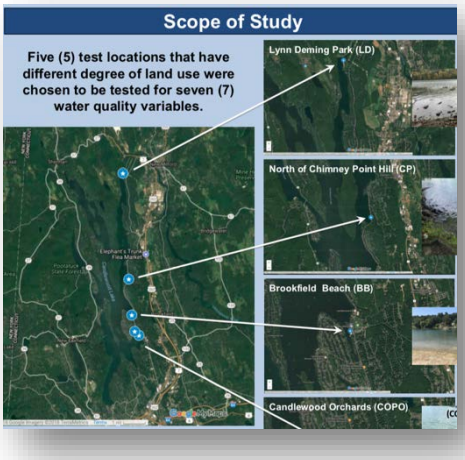
3-4 Week Project:

- Week 1: Meet to finalize your plan: what water body will you sample, where specifically will you sample, what parameters will you measure, when and how often will you conduct your field work, and do you need any special preparation?
- Weeks 1-2/3: Collect data.
- Week 3: Analyze data. Study your data and decide if there are any trends or observations that you want to report, above and beyond the simple results. For instance, does a parameter (temperature, conductivity) vary consistently in (for example) a downstream/upstream direction?
- Week 3-4: Work on your final project. The CTP Coordinator is here to answer your questions about posters, videos, etc.

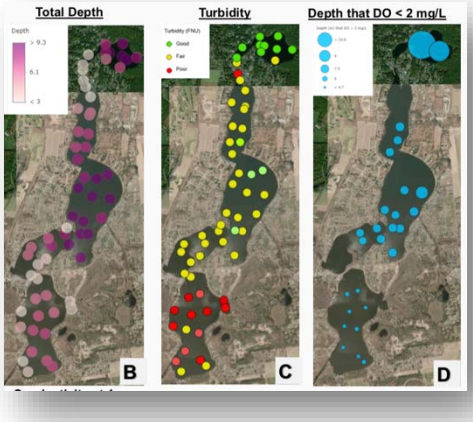
6-8 Week Project:

- Week 1: Meet to finalize your plan.
- Weeks 1-5/6: Collect data. Once a week may be as intense a sampling regime as your schedule allows. If you have a specific phenomenon you are looking at, how does that dictate your sampling regime?
- Week 3-4: Analyze data. Study your data and decide if there are any trends or observations that you want to report, above and beyond the simple results. For instance, does a parameter (temperature, conductivity) vary consistently in (for example) a downstream/upstream direction?
- Week 8: Work on your final project. The CTP Coordinator is here to answer your questions about posters, videos, etc.

Sample Projects:



Candlewood Lake: A student from Brookfield High School partnered with a Board Member of the Pratt Nature Center to study how land use affects water quality in Candlewood Lake. The team used EpiCollect5 to collect data on land use around the lake. They collected water samples and tested them using hach kits and a conductivity meter. Based on the results, they made recommendations for improving the quality of water in the lake. Learn more about the project from their NRCA conference poster: http://nrca.uconn.edu/students-adults/documents/posters2017/Jaich'iLevi.pdf



Congamond Lake System: A Suffield High School student partnered with a volunteer from the Congamond Lake Management Committee to study how the three ponds that make up the lake system differ in terms of depth profile and water quality. The team used track kit to rcord waypoints where data was collected on water quality and depth. A fish finder was used for depth determination and a professional multi-parameter water quality meter was used for water health. Learn more: http://nrca.uconn.edu/students/documents/posters2017/brooketillotson.pdf