

BSc in Applied Freshwater & Marine Biology, Limnology & Oceanography

Lough Corrib Catchment Field Trip

Lough Corrib is the largest lake in the Republic of Ireland with a surface area of 18,133 ha and is the main feature of the Corrib Catchment Basin (area = 32,320ha).

The main rivers flowing into the lake are the:

Lough Kipp River

Owenriffa river

Bealnabrack/Joyces river

Cong

River Cross

River Clare

Because of the varying geological substrata and overlying soils through which these rivers run, the chemical status of the lake varies considerably from its beginnings in the Maam valley to its estuary in Galway city.

On the field trip, we will measure certain parameters of these rivers and compare them in a field report.

Waste chemicals must be disposed of in the bottle provided and Biosecurity Protocols MUST be carefully followed when moving between sites.

Site 1 Lough Kipp River

Clydagh Bridge is on the lower reaches of the Lough Kipp River. Note the possible water levels typical of a spate river - they may be high now due to recent rainfall. You will carry out your river profile and macroinvertebrate sampling at this river.

Site 2 Owenriffa River

Note how the waters have undercut the rock on the left hand side of the river. Above the village is an excellent area for spawning salmon. You are **NOT** to enter this river as it contains a protected species under the Habitats Directive. Your lecturers will provide a sample of water for you to analysis.

Site 3 Bealnabrack River

The sampling site at Maam is near the top of the lake and holds the water of two rivers - Joyces and the Bealnabrack.

Site 4 Cong

In Cong village, the waters from Lough Mask flow into the Corrib near Ashford Castle. Note the waters rising up on the right-hand side of the bridge and flowing past the salmon hatchery. The level of Lough Mask is approximately 11m above that of Lough Corrib so the water rises here under considerable pressure.

Site 5 River Cross

At the river Cross, you will see evidence of a mill race once used for driving the mill wheel of the nearby mill. In recent years, the mill race was used as a mini hatchery for trout but is now disused. You will carry out your river profile and macroinvertebrate sampling at this river.

Site 6 River Clare

The Clare River is the largest river flowing into Lough Corrib. It drains a large part of East Galway. Some land run-off enters the river as does some of the waste water from Tuam and other small towns. Note the drainage till mounds on the river banks which are the remnants of a drainage scheme carried out in the mid-fifties.

Tasks during the field trip:

1. **Write a short site description of each site** (consider the following: geology, soil type, water depth, river width, riparian zone, surrounding land-uses)
2. **Measure chemical parameters:** pH and Temp
Conductivity and Temp
Dissolved oxygen (mg/l & % sat) and Temp
Alkalinity
Hardness
Take a 1l water sample for N & P analysis

Alkalinity tests (High Range)

- a. Fill the glass mixing bottle to the second line with the water sample to be tested
- b. Add one drop of Phenolphthalein Indicator Solution to the mixing bottle
- c. If the water remains colourless, the phenolphthalein alkalinity is zero. Proceed to Step E
- d. If the water turns pink, add Sulphuric Acid Standard Solution drop by drop to the mixing bottle. Count each drop added until the solution becomes colourless. The phenolphthalein alkalinity corresponds to the number of drops of Sulphuric Acid Standard Solution added to change the colour from pink to colourless
- e. Add the contents of one Bromcresol Green-Methly Red powder pillow to the mixing bottle and swirl.
- f. Add more Sulphuric Acid Standard Solution to the mixing bottle drop by drop until the colour changes from blue-green to pink. Continue counting each drop added to the mixing bottle.
- g. The total alkalinity in grains per gallon CaCO_3 is equal to the total number of drops of Sulphuric Acid Standard Solution added
- h. To express the results in mg/l, multiply the number of grains per gallon by 17.2

Alkalinity tests (Low Range)

- a. Fill the glass mixing bottle to the first line with the water sample to be tested
- b. Add one drop of Phenolphthalein Indicator Solution to the mixing bottle
- c. If the water remains colourless, the phenolphthalein alkalinity is zero. Proceed to Step E
- d. If the water turns pink, add Sulphuric Acid Standard Solution drop by drop to the mixing bottle. Count each drop added until the solution becomes colourless. The phenolphthalein alkalinity corresponds to the number of drops of Sulphuric Acid Standard Solution added to change the colour from pink to colourless divided by 2.5
- e. Add the contents of one Bromcresol Green-Methly Red powder pillow to the mixing bottle and swirl.
- f. Add more Sulphuric Acid Standard Solution to the mixing bottle drop by drop until the colour changes from blue-green to pink. Continue counting each drop added to the mixing bottle.
- g. The total alkalinity in grains per gallon CaCO_3 is equal to the total number of drops of Sulphuric Acid Standard Solution added
- h. To express the results in mg/l, multiply the number of grains per gallon by 17.2

Remember !! You only divide by 2.5 the number of Sulphuric Acid Standard Solution drops added between steps a-d . Always multiply by 17.2 to convert grains per gallon to mg/l.

Hardness

- a. Fill the glass mixing bottle to the second line with the water sample to be tested
- b. Add three drops of Buffer Solution (Hardness 1) to the mixing bottle and swirl
- c. Add one or two drops of ManVer Hardness Indicator Solution (Hardness 2) to the mixing bottle and swirl
- d. Add titrant reagent (Hardness 3) drop by drop to the mixing bottle until the colour changes from pink to blue
- e. If the water remains colourless, the phenolphthalein alkalinity is zero. Proceed to Step E

- f. The hardness in grains per gallon CaCO_3 is equal to the total number of drops of Titration Reagent added
- g. To express the results in mg/l, multiply the number of grains per gallon by 17.2

NB! Waste chemicals must be disposed of in the bottle provided.

3. At two sites we will construct river profiles and measure flow rates to enable the calculations of river discharge:

- Using a tape, measure the width of the river in 1m intervals
- Using a meter ruler or the staff of the flow meter, measure the depth at each 1m interval
- Measure the water velocity at the centre of each interval (every 0.5m interval) using a flow meter
- Repeat this procedure moving across the river until you have all the measurements for each section

4. At two sites we will measure biological parameters: Macroinvertebrate diversity (kick sample) and water quality using the SSRS

Three, 1-minute multi-habitat (riffle, run, glide, pool) kick samples will be taken at the River Kipp and Cross River using a standard pond net (mesh size). Each sample is to be stored in a separate bucket and covered with 70% IMS to preserve the specimens for analysis during the follow-up practical.

5. Understand and implement Biosecurity Protocols for Freshwater Science

GMIT Biosecurity Protocol (adopted from IFI Biosecurity Protocol for Field Survey Work and Invasive Species Ireland Water Users Code of Practice):

1. Visually inspect all equipment (under the buckets and along the rack, life jackets, fieldwork clothing) that has come in contact with the water for evidence of attached aquatic invasive species (AIS) or other plant or animal material before leaving the site.
2. Wipe, using a cloth, the bottom of each sampling bucket with 1% Virkon Aquatic before placing the buckets in the van for transportation
3. Wellington boots will be dipped in or scrubbed with 1% Virkon Aquatic and dried using a cloth
4. All PPE will be visually inspected and should be wiped down with a cloth soaked in 1% Virkon Aquatic solution
5. Sampling equipment must be cleaned, rinsed and wiped down with 1% Virkon Aquatic
6. We currently use 1% Virkon Aquatic for all our freshwater sampling and have installed a hot water tap (40°C) in the laboratory to wash equipment on returning from fieldwork.

Lough Kipp River				River Cross		
Position (m)	Depth (m)	Seconds per 50 pulses		Position (m)	Depth (m)	Seconds per 50 pulses
0				0		
1				1		
2				2		
3				3		
4				4		
5				5		
6				6		
7				7		
8				8		

	Units	Lough Kipp	Owenriffe	Bealnabrack	Cong	Cross	Clare
pH	pH units						
Conductivity	µS/cm						
Temperature	°C						
Dissolved Oxygen	mg/l						
	% sat.						
	°C						
Hardness	mg/l CaCO ₃						
Alkalinity (LR)	mg/l CaCO ₃						
Alkalinity (HR)	mg/l CaCO ₃						
Nitrate	mg/l						
Phosphate	mg/l						