**Objective:**
Determine a water budget for a farm pond by measuring or calculating the inputs, outputs, and storage over the 6-month period from May 2015 through October 2015.

**Introduction:**
- Timbercreek Farm (TCF) is a permaculture farm located near Charlottesville, Virginia.
- We investigated the hydrology of the farm pond at Timbercreek Farm (TCF) through calculation of its water budget in order to inform a nitrogen budget for the pond and the farm that is currently being developed.
- Calculating a water budget for the pond is essential to understanding the fluxes of both H₂O and N for TCF and to quantifying the role of the streams and the pond in the nutrient fluxes through the surface waters.
- The biggest input and output from the pond were assumed to be the surface water inflow and outflow, although we also considered precipitation, overland flows, groundwater inflow, and groundwater outflow in the determination of the water budget.

**Methods:**
- Field workers estimated discharge bi-weekly by making current-velocity measurements cross-stream transects at sites H, B, and J on eighteen dates from May 2015 through October 2015, and applying the velocity-cross sectional area method to obtain the discharge.
- A rain gauge was installed next to an evaporation pan near site B to measure precipitation and evaporation.
- Daily precipitation data from the Charlottesville-Albemarle Airport (KCHO) and compared to the weekly rain gauge values (Cattell Noll, 2016).
- The Hamon method was used to estimate the evaporation rate and those results were used for comparison with results from the evaporation pan.
- The bathymetry of the pond was determined using a sounding line cast from a row boat at 62 GPS-located points in the pond.
- The area of the pond was estimated using GIS and used to convert and scale the precipitation and evaporation values.
- Groundwater flows were assumed to be much smaller than any other flux and so were ignored for these calculations.

**Results:**
- Stream discharge varied on the order of 1000-26000 m³/week. Precipitation varied from 0-2000 m³/week.
- Precipitation was variable from week to week, but was mostly consistent over the 6-month period (Figure 2).
- Evaporation during the summer tended to be higher than in the early fall.
- Total water flux into the pond was 1.2 x 10^5 m³ and total water flux out of the pond was 1.3 x 10^5 m³ over 6 months.
- When averaged out over the study period the difference was about -520 m³/week of the surface water discharge or about 7% of the pond volume.
- The approximate area of the pond surface was 5000 m² with an average depth of 1.1 meters.

**Conclusions:**
- The main driver of water into and out of the pond is the surface water.
- Precipitation and evaporation made up 5.1% and 3.8% of the inflow and outflow, respectively.
- The difference between total water flux in and total water flux out might be accounted for by a net positive groundwater flow.
- Over the study period, the difference between inflow and outflow is between 7 and 8% of the total flux. The deficit suggests a net groundwater input of water unaccounted for that keeps the pond from depleting.

**Future:**
- The water budget consists of six months of data from May 2015 through October 2015 that look directly at surface flow, precipitation, evaporation, and the pond volume.
- With information collected since the beginning of the project at sites A and C of the relative inflow and outflow of the pond, we will be able to determine a more broad water budget over the past 3 years.
- The water budget at the end of the year will give a fuller look at how the variables of the water budget affect the N budget for the pond.

**REFERENCES**