IDS 366 – Sophomore Seminar II
Mile High Chemistry
Yost Lake Report 2

Contents:

Section I.1 ~ GLX Data (Lab 1A)

Control Sample:

Latitude:	37.744259°
Longitude:	-119.096361°
Elevation	9,100 feet
Air Temp:	10.1℃
Wind Speed:	0
Wind Direction:	-
Relative Humidity:	24%
Water Temp:	11.82℃
Conductivity:	4.8 mS/cm
pH:	7.52
Dissolved Oxygen:	9.9 mg/L
D.O. Corrected	8.183
% Saturation D.O.	120.976

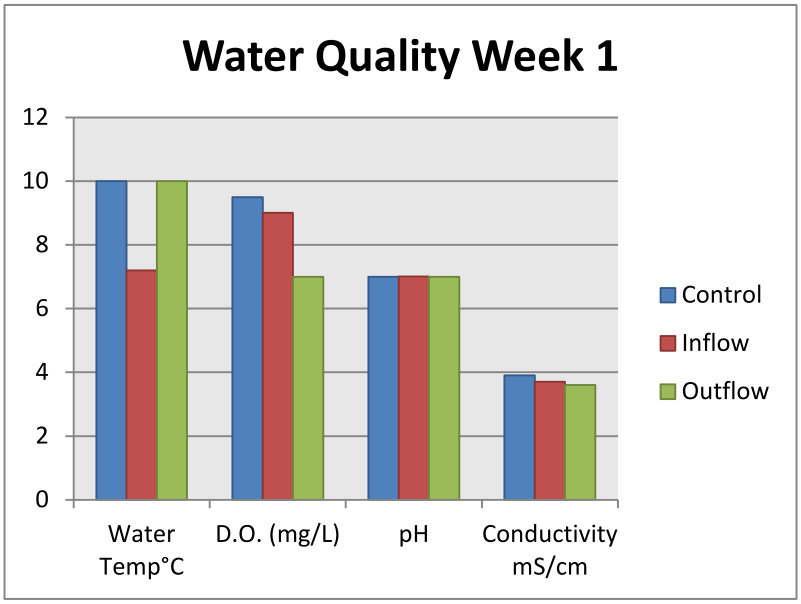
Inflow Sample:

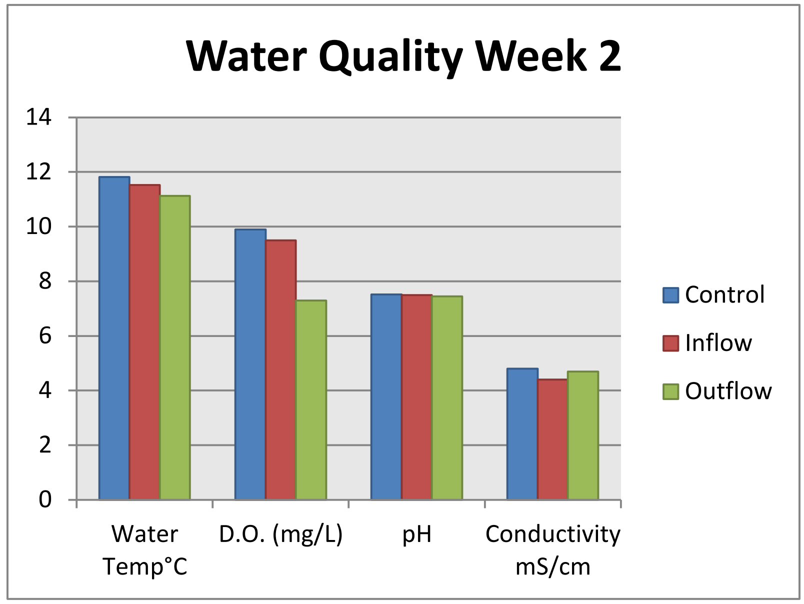
Latitude:	37.744030°
Longitude:	-119.095328°
Elevation	9,100 feet
Air Temp:	14.2℃
Wind Speed:	4.2
Wind Direction:	35°
Relative Humidity:	18%
Water Temp:	11.53℃
Conductivity:	4.4mS/cm
pH:	7.50
Dissolved Oxygen:	9.5 mg/L
D.O. corrected	7.532
% Saturation D.O.	126.134

Outflow Sample:

Latitude:	37.744259°
Longitude:	-119.096361°
Elevation	9,100 feet
Air Temp:	10.2℃
Wind Speed:	2.5
Wind Direction:	65°
Relative Humidity:	29%
Water Temp:	11.13℃
Conductivity:	4.7
pH:	7.45
Dissolved Oxygen:	7.3 mg/L
D.O. Corrected	8.183
% Saturation D.O.	89.204%

Section I.2 ~ GLX Data Graphs (Samples 1 & 2)





*Note: Water Quality Week 2 has a larger scale

Section I.3 ~ GLX Data Interpretation

The two sets of data were taken 10 days apart. Water temperature varied the most of the data, and that is not surprising because the data in Week 1 were taken in the late afternoon (between 2 and 4pm) and the data in Week 2 were taken in the morning (between 9 and 10am). The pH of the water also rose from an average of 7.0 to an average of 7.49. Our conductivity also rose slightly rising from an average of 3.72 to 4.63. The D.O. stayed constant with an average of 8.6 for our first readings and rising to 8.9 for our second week.

Section I.4 ~ Lake Depth Data

Lake Depth: 8 meters
Turbidity: 2 meters

Deep Water Sample: Data coming as tested

- Alkalinity
- Nitrogen

IDS 366 – Sophomore Seminar II
Mile High Chemistry
Yost Lake Report 2

Section I.5 ~ Stream Flow Data (Lab 1B)

DIST	DEPTH	COUNTS	VEL (m/s)	VEL (ft/s)	AREA	FLOW
0.5	0	-	-	-	-	-
1	0.42	1	0.050854	0.166801	0.21	0.035028
1.5	0.6	2	0.051708	0.169602	0.3	0.050881
2	0.825	4	0.053416	0.175204	0.4125	0.072272
2.5	0.975	4	0.053416	0.175204	0.4875	0.085412
3	0.9	7	0.055978	0.183608	0.45	0.082624
3.5	0.85	4	0.053416	0.175204	0.425	0.074462
4	0	-	-	-	-	-

Stream Flow: 0.400678ft^3/sec

Section I.6 ~ Water Sample/Stream Flow GIS Mapping

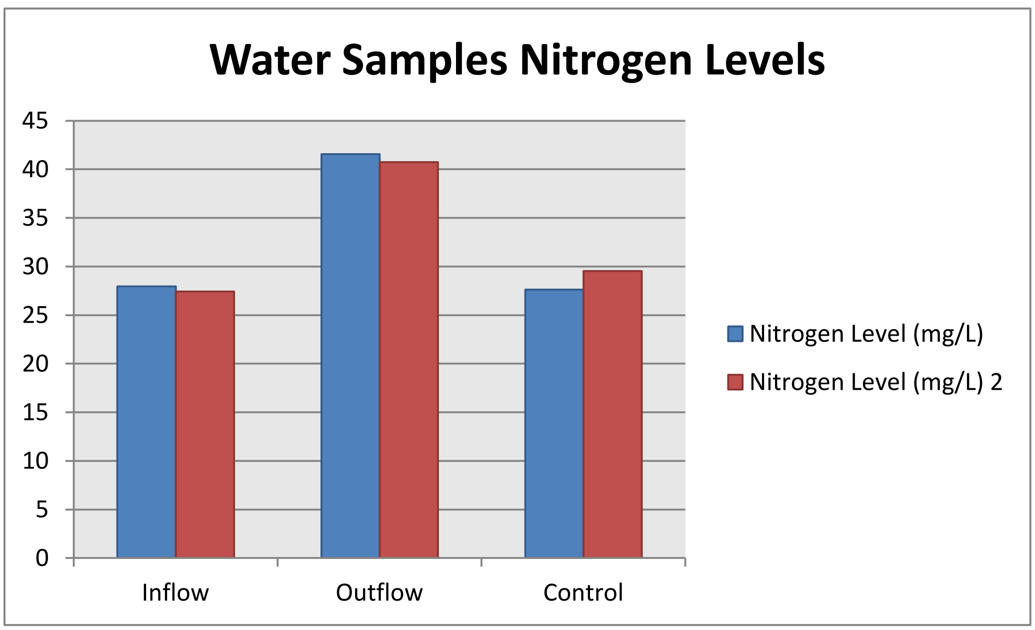
IDS 366 – Sophomore Seminar II
Mile High Chemistry
Yost Lake Report 2

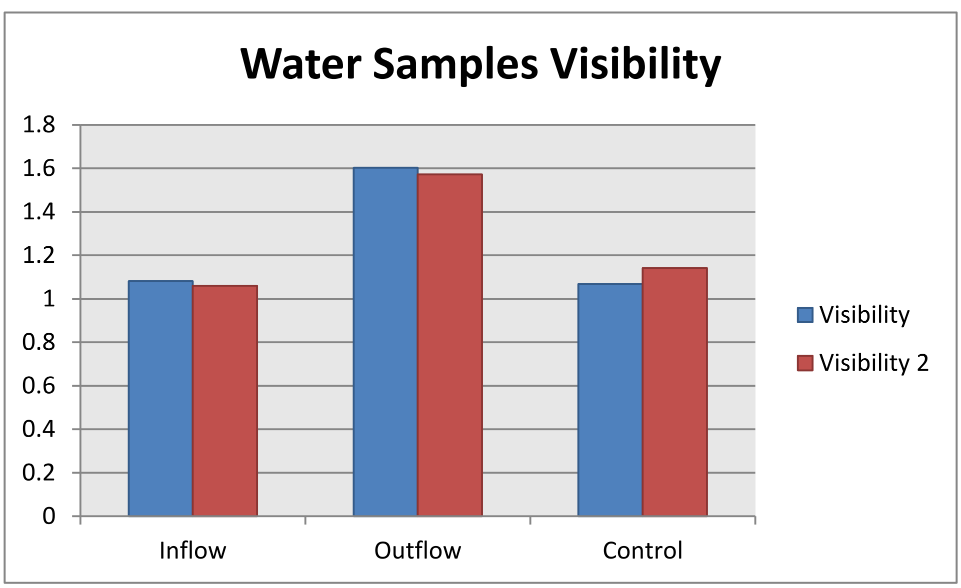
Section II.1 ~ Why Nitrogen Matters

Nitrogen is crucial to supporting plant life in an aquatic environment (e.g. a eutrophic lake) because it is a nutrient/fertilizer for plant growth. The problem with Nitrogen is, despite its abundance in the atmosphere, it is limited as a nutrient for plant growth, because plants can only take it in two forms: as ammonium ions (NH_4^-) and nitrate ions (NO_3^-). It is important to analyze nitrogen levels, because it is one indicator of plant life levels, which indicates how eutrophic a lake is, and whether it is in danger of becoming hypereutrophic or not.

Section II.2 ~ Nitrogen Data (Lab 4)

Sampling site	Visibility	Nitrogen Level (mg/L)	Visibility 2	Nitrogen Level (mg/L) 2
Inflow	1.08	27.9375	1.06	27.41666667
Outflow	1.603	41.55729167	1.572	40.75
Control	1.068	27.625	1.141	29.52604167





Section II.3 ~ Nitrogen Stages Discussion – Yost Lake

Considering the various stages of Nitrogen loading, Yost Lake is clearly not at Stage 0 where plants are taking up N faster than it is produced. From our results, there is no shortage of N in the lake. While an excess of Nitrogen is a characteristic of a Stage 2 lake, there is not enough plant life in the Lake to support that characterization. It seems more likely that as the annual spring snowmelt has happened recently, the lake is experiencing a Nitrogen pulse. If this study were to continue in the weeks after our May Term, one would expect to find the N-levels would drop, and slowed plant growth (limited Nitrogen) to happen by early summer.

Nitrogen Standard Deviation and CI95

Standard Deviation = $\pm$0.054 mg/L
CI95 = 32.427 / 32.513

IDS 366 – Sophomore Seminar II
Mile High Chemistry
Yost Lake Report 2

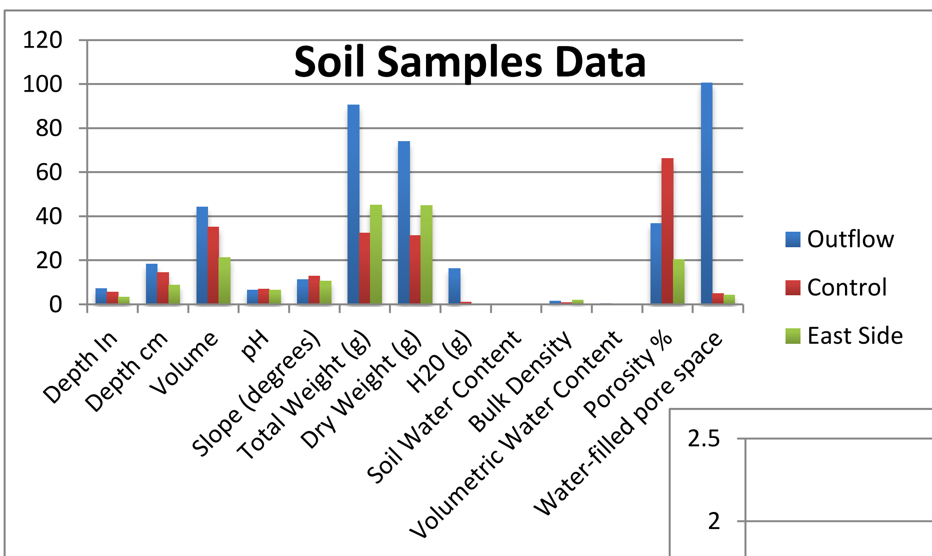
Section III.1 ~ Why Soil Matters

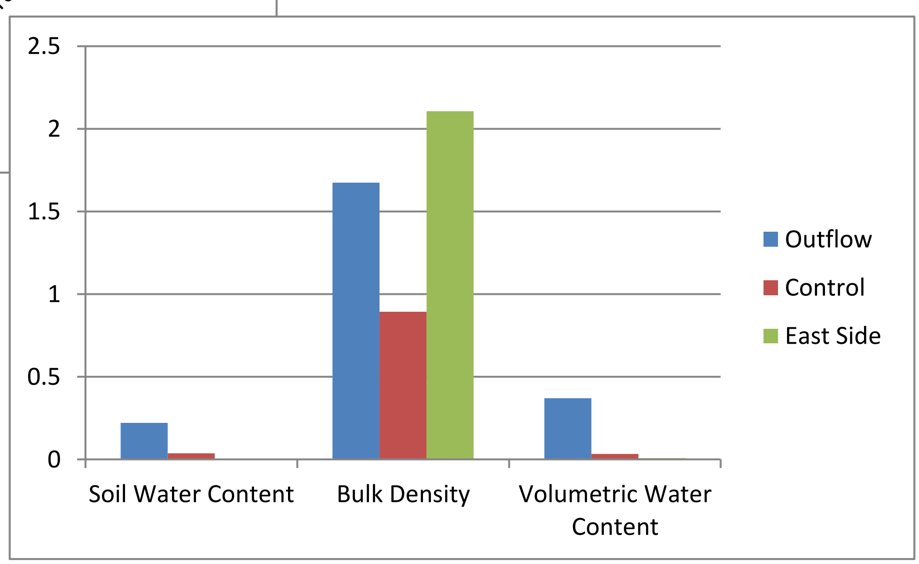
Soil is essential to plant growth, because 14 of 17 essential plant nutrients are absorbed from the soil. Therefore, the quality of the soil becomes a major factor in which plants can grow in a region: how much water is in the soil, how dense the soil is, and the pH of the soil as specific examples. Specifically, pH greatly affects the solubility of minerals or nutrients; in strongly acidic soils (pH 4-5) there can be high concentrations of aluminum, iron and manganese. While a mild pH range of 6-7 offers the greatest opportunity to a variety of plants, some plants such as azaleas, blueberries and conifer trees thrive in acidic soils. Measuring the soil quality will give scientists an idea of what kind of plant life can grow (and thrive) in a given area, and in turn, that can tell a scientist the quality of a lake by the presence or absence of plant life (and what kind of plant life).

Section III.2 ~ Soil Analysis Data part 1 (Lab 5)

Sample	Depth In	Depth cm	Volume	pH	Slope (degrees)	Total Weight (g)	Dry Weight (g)	H20 (g)
Outflow	7.25	18.415	44.2708109	6.5	11.3	90.52	74.133	16.387
Control	5.75	14.605	35.1113328	7	12.95	32.51	31.3467	1.1633
East Side	3.5	8.89	21.3721156	6.5	10.61	45.2128	45.0273	0.1855

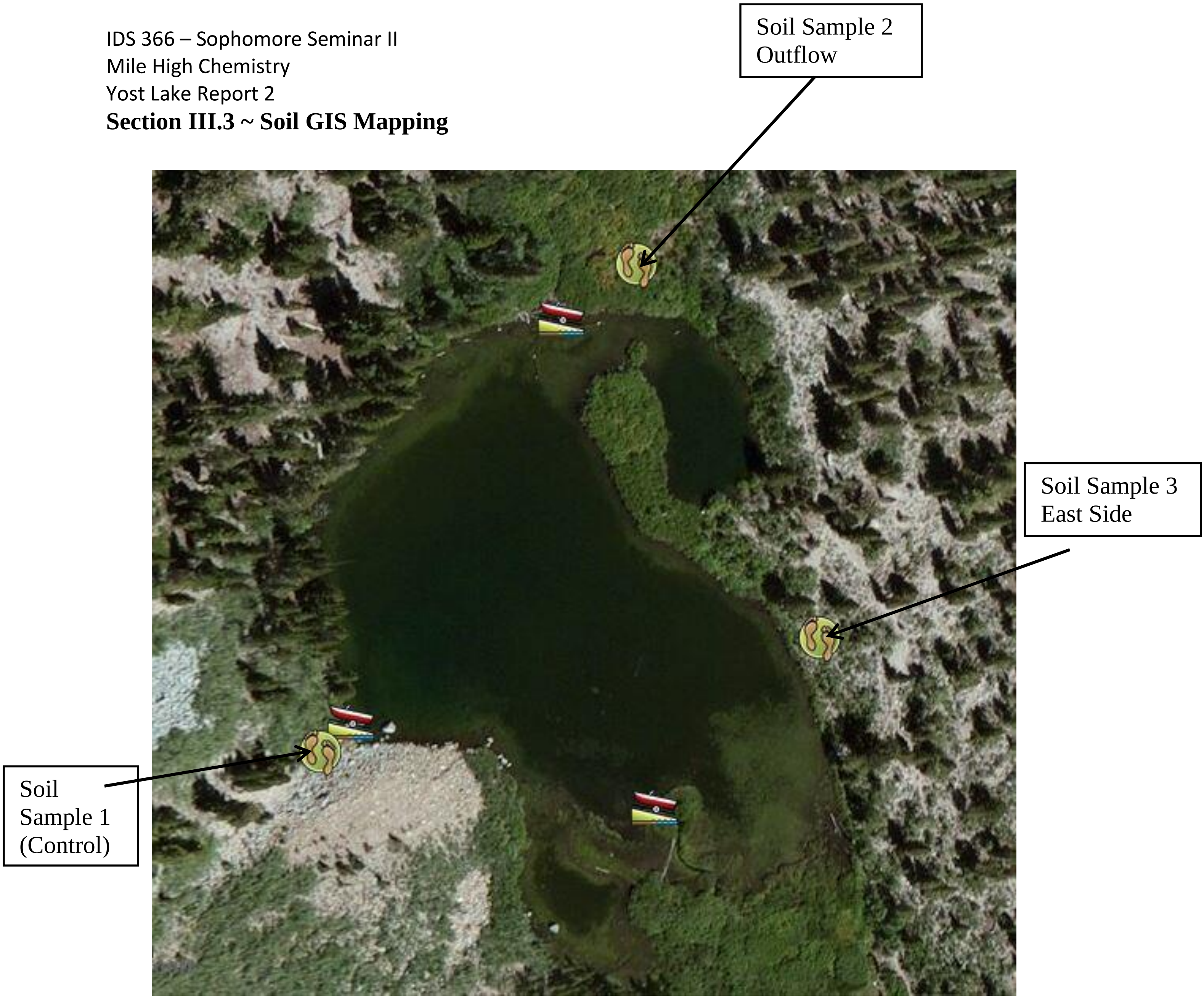
Sample	Soil Water Content	Bulk Density	Volumetric Water Content	Porosity %	Water-filled pore space
Outflow	0.22104866	1.67453449	0.3701536	36.8100191	100.5578395
Control	0.03711076	0.89278012	0.03313175	66.3101841	4.996480298
East Side	0.00411972	2.10682465	0.00867953	20.4971831	4.234500799

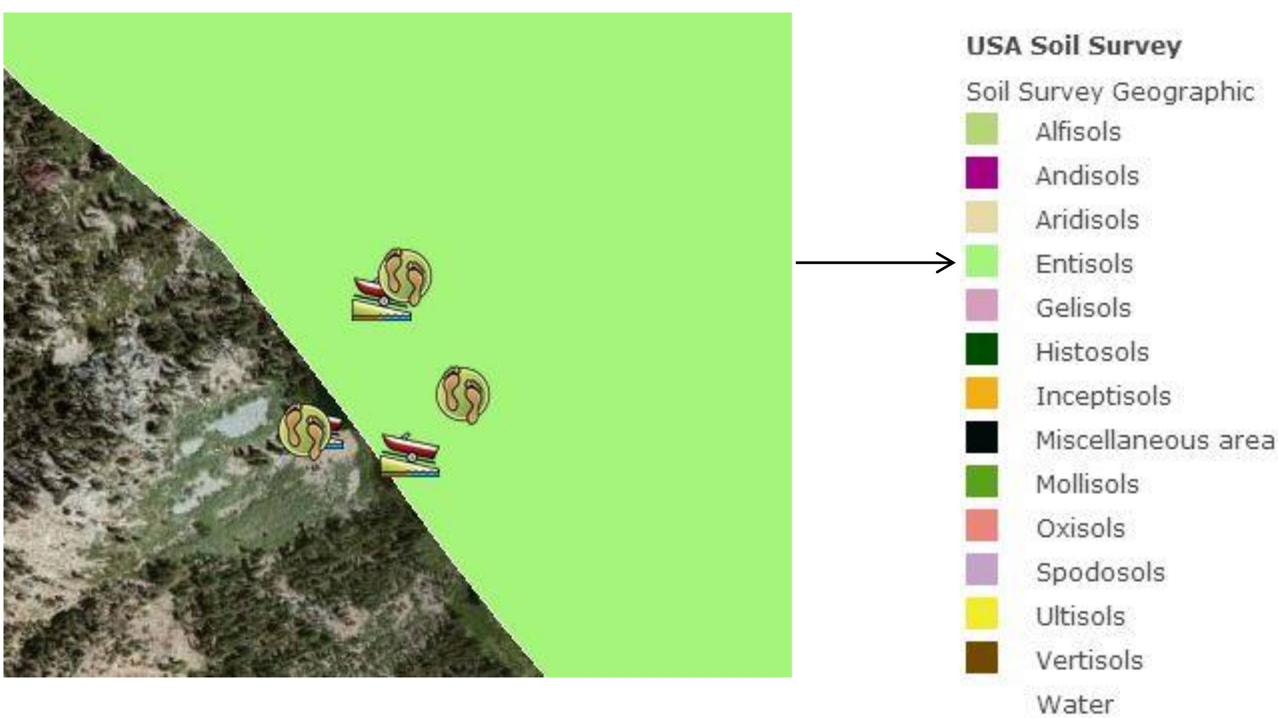


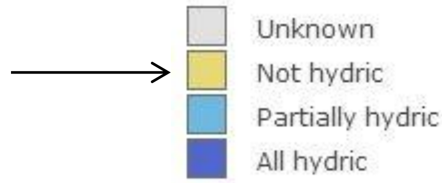


IDS 366 – Sophomore Seminar II
Mile High Chemistry
Yost Lake Report 2

Section III.3 ~ Soil GIS Mapping







(USA Soils Hydric Classification): This map is telling us that the lake site's soil is not hydric, meaning it is never wet enough to be classified as a wetland, which makes sense, because the soil-water content for the soil farther away from the lake was 0.004 on the East side (for example) – difficult to see, even on a magnified graph.

Section III.4 ~ Basin Characteristics Discussion (Clow)

Considering the Basin Characteristics study by David Clow, the discussion on steep slopes with un-vegetated terrain was highly relevant. The SW shore of the lake is a steep slope, un-vegetated and covered with young debris not yet eroded (fist-sized rocks and larger). In Clow's study, such environments indicated dilute bodies (of water) because of minimal soil development. This was in accordance with the GIS USA Soils Survey, which indicated an Entisol soil (included above). Entisol soil is characteristic of lacking soil beyond the A-horizon, and is unaltered from its parent rock.

Clow also addressed the low alkalinity these types of lakes have. Again, this corresponded with the finding of our lake, whose alkalinity levels were < 20mg/L. The consequence is the lake has a low buffer to acidification of its environment.

Another feature positively correlated with steep slopes, little vegetation and young debris is runoff. This is in agreement with our findings as well. We found high Nitrogen levels in our lake (though it should be noted our Outflow sample was exaggeratedly high, and will be repeated), and the conclusion is, it is from the recent snowmelt flooding into the lake.