

Arcade Creek Project Long Mapping

Protocol in Progress 10/2015

What is Long-Mapping?

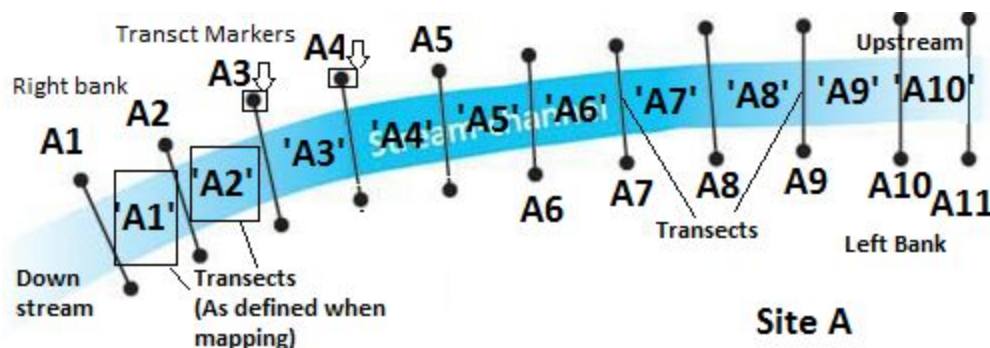
Long Mapping is the ACP study that deals with mapping the geographic shape and state of the creek. This is accomplished by establishing clearly defined transects, taking GPS data within the creek, and uploading that data, along with data from all other studies, into the ArcGIS Database. In a ways, Long-Mapping serves as a foundational point for the entire ACP, as it determines where the reach of the ACP begins and ends, and presents all geographic data relating to the ACP in one place. Several other studies, such as Botany and Habitat, also rely on the transect markers established by Long-Mapping members.

Responsibilities of the Long Mapping Study:

- Establish and maintain all transects and transect markers at all sites
- Taking accurate data that marks the progression of the creek
- Understanding the BaseCamp and ArcGIS programs
- Imputing data taken from Long Mapping, as well as all other relevant geographic data, into the ArcGIS Database
- Assisting Botany, Restoration, and Habitat with taking and utilizing data relating to their studies

Creek Terminology

There are currently 7 sites in the Arcade Creek Project, spanning roughly 5 miles, and are arranged in the following order along the creek: A, B, C, G, D, E, F, G. Site A is the most downstream and Site F is most upstream. The creek, therefore, (theoretically) flows from Site F to Site A.



If one were facing Site F and beyond, and water was flowing towards them, they would be facing **upstream**. Inversely, if one were facing Site A and beyond, and water was flowing away from them, they would be facing **downstream**. Long Mapping **always takes data in the upstream direction**, so ensure you are always in the correct direction when taking data.

The bank on one's left when facing downstream is **left bank**, and the one on the right facing upstream is **right bank**. Again, since Long Mapping takes data in the upstream direction, **right bank and left bank are reversed in the mapper's view**. A common mistake is for mappers to

take correct data, but accidentally mislabel the left and right banks. Right bank and left bank also have an **upper bank** and **lower bank**. Lower bank is the point where the bank meets the water (theoretically), while upper bank is the highest point of the bank when standing in the creek.

Transects are the invisible “lines” that are signified by transect markers that divide a site. They are not the area between transect markers; they are instead the markers themselves. Each site has **11 transect markers**, each marker signifies the site and transect number (ie. Site A, Transect 3 is labeled A3).

Since there are 11 transect markers, there are 10 “areas” between Transect 1 and Transect 11 of each site, available for mapping. For convenience **when mapping the area between Transect 1 and 2 is referred to simply as Transect 1**, and vice versa for all other transects. This is why, on previous creek data, there is never a “Transect 11” labeled.

Other vocabulary terms include:

- Bar: A more or less flat, exposed area of sediment connected to the bank at some point
- Island: A more or less flat, exposed area of sediment not connected to the bank at any point
- Sampling: A complete set of all data during a time frame. In this project, two samples are taken per year, one in the fall and one in the spring.
- Width: The distance from one end of something to the other from a left bank to right bank direction.
- Range Finder: The equipment sometimes used by Long Mappers to accurately measure the distance between two points using infrared lasers. This once was previously used as the standard tool of measurement for the Long Mapping study, before the GPS.
- Thalweg: A sudden drop in the creek bottom, usually several inches to a couple of feet deep. They are **very dangerous** if stepped into, as they can drag people down with water pull.
- Riparian Corridor: An area of land surrounding a waterway that provides easy access for animals to water, generally categorized by high tree content. The entirety of Arcade Creek is contained in a Riparian Corridor.
- Reach: The span of a particular area in question. The reach of the Arcade Creek Project is from Site A to Site G, while the reach of each site is from Transect 1 to Transect 11.

Equipment

For each Long Mapping outing, Site Leaders should check out all needed equipment from the ACP room, and log the checkout with a Tech member via Bento. Also, do not forget to bring a blue hour sheet every time you go on an outing, and to log hours on both the blue sheets and the Dashboard system. Please return equipment after use as soon as possible; this allows all groups to use equipment efficiently when needed.

Please treat all creek equipment with care and value. Never throw equipment, leave equipment at the creek, or leave batteries in devices when not in use (specifically the GPS units, as this can cause corrosive leaks). Never loan equipment to others outside of your creek group, as you are held responsible for any lost equipment.

Equipment List:

- Transecting
 - Measuring Tape or Rangefinder
 - Flagging tape
 - Tags
 - Permanent marker
 - Ballpoint Pen
 - Weatherproof Philips screws
 - Drill and drill bits, Philips screw bit
 - Philips-head screwdriver
 - Garmin GPSMAP 62 GPS Units (8)

- Mapping and Data Collection
 - Waders (if necessary)
 - Garmin GPSMAP 62 GPS Units (8)
 - Measuring tape or Rangefinder
 - Stadia rod
 - Clinometer
 - Densiometer
 - Computer with BaseCamp and access to ArcGIS Online
 - USB cable

Note: Ensure batteries are added the GPS Units prior to the outing, and that they are removed after checking back in equipment.

Transecting:

1. Locate Transect 1 of the desired site.
2. Mark on 1 tag, using a ballpoint pen or a screwdriver, the first letter of your site and the number 1 to signify Transect 1 (ie. A1)
3. Tear off a length of flagging tape, and write the same letter-number abbreviation on the tag in permanent marker. Tie the length of flagging tape to the loop of the tag
4. Remove the previous marker using a screwdriver or a drill, and drill in a new hole for the new transect marker in the same tree. Choose a location that is clearly visible, and can be viewed from both the creek and the bank, then screw in the new tag.
5. Locate Transect 2
6. Using a rangefinder or measuring tape, determine the distance between the two transects. The distance between transects should be approximately 10 meters. If the length is shorter than 10 meters, attempt to find another tree that is approximately 10 meters away, or if not available, further. Remember, it is better to go farther than it is to go shorter than 10 meters.

7. Once you have determined the tree you will be using, follow Steps 2 and 3 to prepare the marker, instead using 2 for Transect 2. Remove the old marker and determine a new location on the desired tree, considering the factors described in Step 4.
8. Repeat Steps 5 through 7 for all other sites.

Mapping and Data Collection

Mapping, Part 1

1. Locate Transect 1 of the desired site, and turn on the GPS. Wait until the GPS has obtained a strong signal (all bars); if the signal is not strong enough, move to an open area, then return once the signal is stronger.
2. Enter the creek, putting on waders if necessary. Walk up to the edge of right bank, as close as possible to the transect marker, to establish a starting point.
3. Press “Quit” to access the quick start menu, go to “Satellites”, and ensure there are at least 4 acquired satellites before proceeding.
4. Return to the quick start menu, wait for the point to stabilize, and press “Mark” to create a waypoint.
5. Scroll to the very top, and set the name in the following format, in all caps: **[Site][Transect Number] [Bank (RB (Right Bank) or LB (Left Bank))][Point Number]**. The first point would be at Transect 1, Right Bank, and Point 1 of the Site. If this were Site A, the point, therefore, would be labeled in the GPS “A1 RB1”. Once you have named this point, scroll down to “Done” and press enter. This creates a waypoint.
6. Walk a meter or so down the bank. Repeat Steps 3 through 5 to find the next waypoint, following the format prescribed above. Continue to take waypoints approximately every meter until the next transect is reached. There should be at least 5 waypoints per bank, per transect.
7. Move back to the beginning of Transect 1, and find a starting point for left bank as close as possible to the original transect marker. Repeat Steps 3 through 6, instead using the label LB before point number.
8. If taking a waypoint is not possible (ie. a large tree is on the edge of the creek), then add a waypoint as close as possible to the obstruction, and label it as follows: [Site][Transect Number] [NMP (Not Mappable)], along with a description in the “Notes” section. Mark all thalwags encountered as follows: [Site][Transect Number] [TWG (Thalwag)]. Mark all dams encountered as follows: [Site][Transect Number] [DAM]
9. When all points are taken for Transect 1, move on to Transect 2, and repeat all above steps.

Habitat Data Collection

One of the responsibilities of Long Mapping is to take data for the Habitat study inside the creek. The following measurements should be recorded on a Habitat sheet, which are available in the ACP room, at each transect:

- Bank Width: The width of the creek at any given time. Use a tape measure or a rangefinder to find the perpendicular distance between left and right lower banks.

- Bank Height: The height of the upper bank of the creek. Have members within the creek hold up an extended stadia rod, and other members on upper bank record the bank height.
- Bank Angles: The angle between upper and lower bank. Lay the extended stadia rod down on the bank, with one end touching upper bank and one end touching lower bank. Then, place a clinometer on the rod, and look into the clinometer or read the side of the clinometer to find the angle.
- Depth: The depth of the water in the creek. Sink the stadia rod into the creek at the beginning of the transect, and record the depth of the water. If there is no water, write N/A.
- Foliage Cover: The density of tree cover of a given transect. Stand at the transect facing downstream with the densiometer facing out from you about 16 inches, and record the number of squares covered by foliage. Repeat this in the upstream, left bank, and right bank directions.
- Concavity/Convexity: The shape of the creek at a given transect. Record the general curvature of the bank closest to the water as either concave, convex, or flat.

Mapping, Part 2

1. Connect the GPS Unit to a computer with BaseCamp and access to ArcGIS Online using a USB Cable.
2. Open BaseCamp. Right click the file “Arcade Creek Data, 2015”, and click “New List”. Name the list in the following format: [Site] [Season] (ie. Site C Fall)
3. Open the Internal Storage Folder, and delete any irrelevant or accidental waypoint data (ie. Garmin Headquarters, “Current Track”, 009). Ensure all data is formatted correctly, and copy and paste all waypoints into the newly created list.
4. Click File>Export, and export your data in the form of a .gpx file. Navigate to the location it was exported to, then right click the file, and select Sent to>Compressed (zipped) folder. This will compress the file into a .zip file, so it can be transferred to the ArcGIS Database.
5. Further instruction will be determined as the data is collected, and we grow familiar with the program.

Botany and Restoration Responsibilities and Data Collection

Further instruction will be determined as details emerge. The Long Mapping Managers will send out an additional protocol after it has developed.

Characteristics of Good, Raw Data:

- Accurate and taken to the best of one’s ability
 - Taken with a strong GPS signal (≥ 5 satellites)
 - No less than 5 points per bank, unless there are regions that are not mappable, with an explanation in the Notes section
- All thalwags and other creek irregularities are marked

- All labels are accurate to the prescribed format
- NEVER FABRICATED. Many universities and government organizations utilize this data, so accuracy is always key, and must be upheld at all times.

Quality Assurance, Quality Control (QAQC)

Each site, in addition to the prescribed protocol, will be asked to remap three non-consecutive transects from the designated sites. These additional waypoints and maps will be compared to the data taken from the original site members, to assure accuracy. QAQC will be assigned once all Leaders complete mapping for their site.

The Goals of Long Mapping

This year especially, the goals of Long Mapping has changed significantly. Previously, Long Mapping had been confined to taking bank measurements and points using rangefinders. However, this year, we have broadened our reach, and we are now responsible for taking GPS coordinate data, and uploading it, along with all other data from all other studies, onto the ArcGIS Online Database. Our goal is not only to track the flow and progression of the creek, but also, to provide a multi-faceted understanding of the geological nuances of the creek by comparing data to previous years. Our involvement in Habitat, Botany, and Restoration allow for members of other studies to keep track of tasks that may have otherwise been difficult without using the GPSs. In other words, Long Mapping is responsible for establishing a record of the geographic evolution of the creek, from mapping invasive plant species to mapping bank erosion.

Safety and Comfort:

Safety:

- Always wear sturdy, closed-toed shoes. The creek has plenty of mud, broken glass, rocks, and other sharp objects.
- Wear pants.
- Avoid poison oak, especially in the spring. “If it’s hairy, it’s a berry, if it’s shiny, watch your hiney”.
- NEVER go to the creek in groups of less than FOUR. This is for safety reasons; If one is injured, one must stay with the injured, and two must go together to get help. Even if it is a simple task, it is critical to keep to this rule.
- Waders are a very dangerous piece of equipment if used improperly. Waders are meant to stay dry and keep water out. However, if water does happen to flow into them, they act as an anchor and pull the person down by the sheer weight of the water. This is especially true with thalwags; if someone falls into a thalwag, and water fills their waders, they can be forced underwater with no way to escape. Always be very, very cautious of your surroundings. Inspect

waders for leaks, and never go in water deeper than your waist. Label areas too deep NMP, and always mark thalwegs on the GPS when mapping.

- Always have at least 1 cell phone with someone in the group when going out. Keep the following medical and nonmedical emergency lines in your cell phone:

- Medical Emergency: (916) 228-3000

- Nonmedical Creek Emergency: (916) 874-5111

Comfort:

- Bring water to stay hydrated, especially on hotter weekends and longer outings, and wear sunscreen

- Bug spray is recommended, as mosquitos are very prevalent at the creek.

- An extra change in clothes is recommended, in case of accidental immersion into the creek.

- All groups are required to carry garbage bags to the creek at every outing to collect any trash they see.

- Get to know your groups. Group members spend many hours together at the creek, and enjoying the company of one another and making friends makes ACP more enjoyable

- Switch positions regularly, so that all members have an opportunity to perform all the activities of the study, which also ensures that nobody gets too tired or frustrated.

Communication:

Check your email and Dashboard for updates and messages daily. This is especially important to ensure that any alerts sent out by managers and Leaders will be seen immediately. In addition, keep the phone numbers of your leader and your group members.

Group members should be organized and considerate. Leaders should schedule outings via email and on Dashboard at least 3-5 days prior to the outing, and all group members should RSVP to outing at least 48 hours beforehand. Obtaining the appropriate number of hours is not difficult, but requires proper planning and communication. RSVPing and dropping outing is irresponsible, and is visible by Managers and teachers via Dashboard. Ensure that you RSVP to all outings beforehand, and if needed, reschedule for another date if not all members are available. If a member fails to show who RSVPed, assistance from a Long Mapping Manager or other members of this study can be requested, and the member will be reported to a Manager or a teacher.

Leaders must be in constant contact with group members. It is the leader's responsibility to ensure all students of the study receive all necessary hours, and to reinforce the habit of good communication.

Integrity and Work Ethics:

At some site, there are conditions that make it difficult to map accurately. For example, at Site E, there are extensive blackberry bushes that make it difficult to access the bank and map it well. However, always make an effort to take data to the best of your ability. If there are any

physical and movable barriers that prevent you from mapping, mark the barrier on the GPS, and contact Restoration to have them remove the barrier to continue mapping later. Never skip over or falsify any data.

Inconsistencies in hours between the tan sheets, blue sheets, and Dashboard should be brought immediately to a teacher. Be sure to stay on top of hours, and finishing hours before IB testing is ideal. Inconsistencies in hours between the tan sheets, blue sheets, and Dashboard should be brought immediately to a teacher. Be sure to stay on top of hours, and finishing hours before IB testing is ideal.

The responsibility is on Long Mapping to accurately map the creek, and to collect geographic data for other studies of the ACP. Leaders must consistently add data to the ArcGIS Online Database, and keep track of all habitat and other study data. Long mapping, especially this year, has become a critical backbone of ACP. We are responsible for keeping an account of practically all geographic data, and forming the reach of the ACP. The work that we do is significant and requires dedication and pride. Good luck, Long Mappers!