This document will take you through all the landscape-related variables that you should attempt to record for each stop. As with the protocol for "Summarizing frog and toad call data", this document has two parts. The first part takes you through a summary of the variables that you will compile. The second part takes you through the calculations step-by-step.

VARIABLES TO BE MEASURED FOR EACH STOP.

A. OBSERVATIONAL VARIABLES. These variables are recorded by looking at your GIS map and possibly also the satellite image. They do not require any formal calculations beyond some adding.

1) NUM_WET (0,1,2). This is the number of discrete wetlands within 200 m of the stop indicated on the NWI layer. This is entered as 0 if you cannot see any wetlands on the NWI layer within 200 m of the stop. It is entered as 1 if you see exactly one discrete wetland within 200 m, and a 2 if you see 2 or more discrete wetlands within 200 m of the stop.

We chose 200 m because the NAAMP protocol calls for each stop to be within 200 m of a visible wetland. However, in some cases, wetlands such as roadside ditches will be visible to NAAMP surveyors but will not appear on the NWI layer. For these (NUM_WET = 0), we can still try to relate amphibian presences to landscape characteristics but we cannot say anything about landscape configuration (e.g. where the wetlands are relative to the other landscape elements). This is sometimes also true when NUM_WET = 2, i.e. there are multiple wetlands at a stop. A few of additional notes:

- You can use the "Select Single Feature" icon on the NWI layer and the NWI attribute table to see what it classified as a "discrete" wetland.

- The wetland doesn't need to be entirely within 200m of the stop in order to count, it just needs to have some part of it within 200 m.

- NWI breaks up rivers into multiple polygons. However, if it looks like one river, call it a single wetland regardless of how many polygons NWI uses to draw it.

- For consistency, use the number of wetlands in the NWI layer (rivers excepted), regardless of what you see on the other layers. It's possible that you may see additional water on the satellite image or on the landcover maps, but please do not include these.

2) WET_TYPE. This variable notes the type(s) of wetlands within 200m of the stop. If you entered "0" for NUM_WET above, this should be entered as "NA." To avoid coding issues, just list the wetland types as they are recorded in the NWI attribute table. With multiple wetland types up to 3, put a comma between them and list them in alphabetical order. If there are more than 3 types of wetlands, just enter "MULT" for multiple types. This should be a rare occurrence.

3) ISO_WET (Y/N). Is the wetland a single, isolated wetland? A wetland would qualify (i.e. ISO_WET = Y) if there is only one wetland within 200 m of the stop and there are no other wetlands within 1000 m of the stop. If there are zero or multiple wetlands within 200 m of the stop, enter "NA" here. If there is only one wetland within 200m but there are other wetlands within 1000m, enter "N" here.

5) ADJ_HAB. Enter the name of the most common adjacent <u>terrestrial </u>habitat to the wetland(s) within 200 m. Please use the habitat codes (i.e. the numbers) from the NLCD classification: http://www.mrlc.gov/nlcd06_leg.php . Some notes about this variable:

- If there are no visible wetlands within 200 m enter NA here.

- If there is one wetland within 200m but there are many adjacent terrestrial habitat types and it's not clear which is the most common, enter NA here.

- If there are multiple wetlands within 200m, but they all have the same most common adjacent terrestrial habitat, you <u>can</u> still make an entry in this column.

- If there are multiple wetlands within 200m but they do not all have the same most common terrestrial adjacent habitat, enter NA here.

6) ADJ_FOREST (Y/N). Is there any forest (green tinted cells, codes 41-43) adjacent to the wetland(s) within 200 m of the stop? To be consistent, even a single cell of forest is enough to enter a "Y" here. If there are no wetlands within 200 m of the stop, enter NA here. If there are one or more wetlands but none of them have any adjacent forest, enter "N" here. If there are one or more wetlands and any of them have adjacent forest, enter "Y" here.

7) WRF_CONFIG (Y/N). Wetland/Road/Forest configuration. Assuming there is at least one wetland within 200 m at the stop, would a frog or toad have to cross a road in order to get to forest somewhere within 1000 m of the stop? Some considerations:

- If there is no wetland within 200 m of the stop <u>OR</u> there is no forest within 1000 m of the stop <u>OR</u> there is no road within 1000m of the stop, enter NA here.   It's only relevant to consider the landscape configuration if the landscape elements of interest are actually present.

- If there is at least one wetland within 200 m and there is at least one road and forest cell within 1000m of the stop , but a frog could move between wetland and forest without crossing the road, enter N here. For example, if one wetland would require a road crossing to get to forest but another would not, this would be an "N."

- If there is at least one wetland within 200 m and there is at least one road and forest cell within 1000m of the stop , and a frog could NOT move between wetland and forest without crossing a road, enter Y here.

8) WDF_CONFIG (Y/N). This is analogous to variable #7 above (WRF_CONFIG), but now we are asking whether or not a frog would need to cross developed land in order to move from wetland to forest (pink to red, nldc codes 21-24). The three bullet points for the variable above are also relevant here.

9) WAF_CONFIG (Y/N). This is analogous to variables #7 and #8 above, but now we are asking whether or not a frog would need to cross agricultural land (nldc codes 81 or 82) in order to get from wetland to forest. See the bullet points above. Also, make sure you're not confusing nldc color code 71 (Grassland)

with code 81 (Pasture/Hay). They can look similar if you don't compare them to the color code reference http://www.mrlc.gov/nlcd06_leg.php

10) HAB_RICH200. This is habitat richness (number of different habitats) within 200 m of each stop. To get this, just count the number of nlcd color codes within 200 m of each stop. Do not count roads as a habitat type. Take your count twice to make sure you got it right.

11) HAB_RICH1000. This is the number habitat types (nlcd color codes, excluding roads, within 1000 m of each stop).

B. GIS CALCULATIONS. This set of variables can't be directly observed but can be calculated with your GIS software.

12) WET_AREA. This is the area of wetlands within 1000 m of each stop. See the next section for how to calculate this.

13) ROAD_LEN. This is the total road length (in meters) within 1000 m of each stop. See the next section for how to calculate this.

14) PROP_FOR. This is the proportion of forest for land within 1000 m of the stop. See the next section for how to calculate this.

15) PROP_DEV. This is the proportion of developed land within 1000m of each stop. See the next section for how to calculate this.

16) PROP_AGR. This is the proportion of land within 1000 m of each stop that is devoted to agricultural use (pasture or cultivated). See the next section for how to calculate this.

17) NOTES. Use this column to explain any problems you might have had, mention anything that struck you as odd