

Culvert Risk Assessment-Watershed/Aquatic Impacts: Quick Reference Guide

Flathead National Forest

The following risk analysis focuses on road/stream interaction at designed stream crossings and provides site specific information regarding stream stability as well as infrastructure function and condition. This analysis was developed on the Flathead National Forest based on common principals in hydrology. This assessment is intended to be utilized in combination with other relevant hydrologic and aquatic information to more precisely determine the level of risk to water quality and aquatic habitat associated with individual stream crossings. Additional attributes specific to aquatic organism passage (AOP) are include in updated versions of the data dictionary although they are not presented in the risk rating table below because this attribute may or may not be desirable at specific locations.

	PR/SR#	Description of Indicator	Rating	
			Good	Poor
Primary Risk # (PR)	1	Channel Alignment	<25 degrees	>25 degrees (higher values increase risk)
	2	Diversion potential	None	1 or 2 ways
	3	Deposition Upstream of Culvert	Limited deposition	Significant deposition
	4	Inlet Rust Line	Less than 1/3 of culvert height	More than 1/3 of culvert height
	5	Evidence of Ponding at Inlet or overflow	No ponding	Ponding evident
Secondary Risk # (SR)	1	Vegetation Blocking Inlet	Inlet not obstructed by vegetation	Vegetation blocking inlet
	2	Floatable debris upstream	Limited or none	Available upstream debris
	3	Unstable upstream eroding stream bank	Stable	Unstable
	4	Streambed mobility (upstream)	stable, dull colored	mobile, bright colored

In General:

- If only 1 or 2 secondary criteria rate as “poor” the feature is more than likely “low risk”.
- If any primary criteria are “poor” OR if more than 2 secondary items are “poor”, the level of risk is increased and the site warrants additional evaluation to determine significance (moderate vs high risk).
- Proximity to fish habitat or other values may elevate risk levels to “critical”.

When to Collect “Culvert” features:

Collect a “culvert” feature at all locations fitted with culverts to facilitate drainage from or through roads. These sites may include stream aligned culverts, ditch relief culverts or culverts dewatering springs or seeps. Collect a “Culvert” feature by following these steps:

1. Select “Culvert” in the data menu and hit “Create”
2. Populate the required data fields, take photos and record any additional information in the notes field.
3. “Log” the feature by standing in the road centerline at the site and hit the “Log” button.
 - a. The unit will beep for every point collected. Collect a minimum of 20 points at the site.
 - b. This is a point feature so make sure you stand still once you hit the “Log” button.
 - c. When your 20 points are collected hit “Done” and save the feature.
4. Create features for Excavated Stream X-ings and other points of interest (Other POI) using these same steps.
5. To log linear features (e.g. RoadLog) let the device collect 1-2 points (1 point = 1 beep) before walking the segment. Hit the “Pause” button if you stop for any reason, and “Resume” when you continue walking. Select “Done” when you are done logging and all required information is input. You can “Pause” logging to input additional data if necessary.

What is a Stream?

For the purpose of this work and as defined in USDA Forest Service RMRS-GTR-280 (2012), a stream must have all of the following attributes:

- a. A continuous feature for 100 feet above and below the influence of the road that has defined bed and banks. If you are not sure of continuity, walk up and down the feature from the road until you are sure it is or is not continuous.
- b. An armored bed (transported sand, gravel, boulders, etc.) Look for armoring in a location outside of the influence of the road.
- c. Evidence of sediment transport and scour. Flow should be frequent enough to maintain the channel features but does not have to be perennial. Similarly, just because flowing water is present does not qualify the feature as a stream.
- d. An average channel width greater than 1 ft. as measured above the road, in a location outside of the influence of the road.

If all of the above qualifications are not met, even if it looks especially stream-like, then do NOT describe the culvert as stream aligned, but as a ditch relief culvert. If all of the above qualifications are met, even if it looks like it should be a ditch relief culvert, describe the culvert as stream aligned. For the purposes of this monitoring effort, we will also include as stream aligned culverts, PERENNIAL SPRINGS which display the above characteristics BELOW the road and are CONNECTED to a stream.

GPS Information:

Password: 042180

- Turn on the GPS unit by pressing the green button on the side. (Pressing this button again will place the device in storage mode without exiting any running programs. To reactivate the screen and continue data collection, press the green button again).
- Use the slide bar to active the password page. Enter the password identified above and tap the lock key in the bottom left corner of your screen.
- Using the touch screen or windows button (bottom left of device) tap or press the windows button.
- Using the touch screen scroll to and select TerraSync (it will be at the bottom of the page once you scroll down). **Only use your finger or the stylus while operating the touch screen. No sticks or pencils!**
- Once the GPS obtains a satellite lock, use the dropdown menu in the upper left labeled "Status" to move from map view to data view. In "map view" you can select the appropriate background file by using the "Layers" drop-down menu, selecting the desired background file (Background Files...) and ensuring a check mark is visible next to "Background" in the "Layers" drop down menu.
- Use the ↗ dropdown to select the appropriate map tools for zooming and panning.
- Again use the dropdown menu from the upper left to navigate to the "Data" screen. **In the "file name" field record the project name, date, and GPS unit # (e.g. 1, 2, 3, or 4),** make sure the data dictionary selected is *"FNFCulvertMonitoring.ddf"*, and select "Create" (you will create a new file each day you collect data). Keep default settings for antenna height. You are now ready to collect features. Feel free to use the drop down in the upper left to switch back and forth between data and map view.
- To collect data, select the appropriate feature (e.g. Culvert, Excavated Stream X-ing, Other POI, or RoadLog) make sure the selected feature name is highlighted (blue) and hit create. Fill out the data sheet and collect all photos. If you miss a required field, you will be prompted to populate that field before the device will save your information.
 - Log the point feature (culverts, crossings, Other POI) or road segment (lines) by tapping the "Log" button on the bottom right hand side of the touch screen. For point features do not move while the device is logging, collect a minimum of 20 points and select "Done".
 - For linear features (RoadLog) let the device collect 1-2 points (1 point = 1 beep) before walking the segment. Hit the "Pause" button if you stop for any reason, and "Resume" when you continue walking. Select "Done" when you are done logging and all required information is input. You can "Pause" logging to input additional data if necessary.
 - You will be prompted to confirm your feature is complete after selecting "Done". Hit "Yes".
 - Once the feature is saved (it may take a minute), you will be directed back to the "Data" home page and able to create another feature (e.g. point or line).
- To edit a feature you created, from the "Data" home page use the "Collect" drop-down menu and select "Update Features". Highlight the feature you wish to update and select "Begin". Hitting "Done" will save your edits. Go back to the dropdown (now identified as "Update") and re-select "Collect Features" to continue survey work.
- Close the file, exit TerraSync and shutdown the GPS unit at the end of the day.
- To shutdown the GPS, press and hold the green button on the side until a screen prompting you to select "shutdown" appears. Select "shutdown" (NOT "reset") and hit ok when prompted.
- Charge the units overnight as battery life is roughly 8 hours.
- Data should be downloaded on a weekly basis.