APPENDIX A

Problem Itemization Sheet

Immediate Post Flood Emergency Stream Intervention
Problem Itemization Sheet

Date: _____ **Time:** _____

Crew: _____

Stream	
Reach	

	YES	NO
Debris Jam at Bridge/Culvert		
Bridge / Culvert		
Location		
Scour at Bridge/Culvert		
Footings exposed		
Undermining		
Mass Failure		
Estimated height (avg)		
Estimated length (avg)		
Number of failures		
Debris/Log/Gravel Jams		
Avulsion		
Estimated length		
Estimated width		
Scouring/ Down Cutting		
Estimated depth		
Head Cut		
Estimated depth		
Gravel Deposits		
Location - center		
Location - left side		
Location - right side		
Estimated height		
Estimated length		
Eroded Banks		
Left bank		
Right bank		
Estimated height		
Estimated length		

Sketch or Comments

APPENDIX B

Immediate Post-Flood Emergency Stream Intervention Suggested Repairs

Immediate Post-Flood Emergency Stream Intervention
Suggested Repairs

Debris Jams at Bridges/Culverts

- Remove the debris
- Do **NOT** over excavate
- Do **NOT** try to deepen or widen the channel
- Do **NOT** use the debris to build berms

Scour at Bridges/Culverts

NOTE: All scour can be dangerous and should be reported to the appropriate owner of the structure which may be the local County Department of Public Works (DPW), NYS Department of Transportation, or local highway agency, as the scour may be severe enough that the structure may need to be closed. If the footing is undermined it should be reported **immediately**.

Mass Failure

- If room is available move the channel away from the land slide, and construct a level bench at the bank-full elevation at the toe of the landslide. Make the bench as wide as possible given the room available.
- If the landslide is blocking the channel remove that portion that is in the channel.
- If trees are leaning at an acute angle and are prying on the earth mass, they may be removed. Leave the stumps in place.
    - Often trees will lean at an acute angle on the bank that did NOT move, but is next to the mass failure. To preserve stability these leaning trees can be removed and their roots can remain in place.
- Keep the number of trees removed to a minimum.
- It can be difficult to determine what trees should taken or even if any should be taken. Should there be any doubts contact SWCD, DPW, DEC or some other organization for technical assistance.
- WARNING – mass failures can be dangerous. Use extreme caution. Seek technical assistance!

Debris/Log/Gravel Jams

- Remove the debris
- Do not over excavate
- Do not try to deepen or widen the channel
- Do NOT use the debris to build berms.

Avulsion

- Seek technical assistance from SWCD, DEC, or some other appropriate technical agency.

Scouring/Down Cutting

- Construct a new channel to bank-full dimensions and with as much floodplain bench as available room allows.
- Usually there is an alternating pattern of scouring/down cutting and gravel deposits. Therefore, a source of material may be located up stream or down stream of the scoured/down cutting reach.

Head Cut

- Usually a cross vane or other similar structure is required to prevent head cutting.
- Seek technical assistance from SWCD, DEC, or some other appropriate technical agency.

Gravel Deposits

- Remove the gravel deposits. Use the gravel in a scoured reach if possible.
- Do not over excavate.
- Do not try to widen or deepen the channel.
- Construct a new channel to bank-full dimensions and with as much floodplain bench as available room allows.

Eroded Banks

- Construct a new channel to bank-full dimensions and with as much floodplain bench as available room allows.
- Slope the eroding banks to a stable slope such as 2:1 or 3:1.
- If the banks are not actively eroding or exhibiting other signs of instability, emergency intervention may not be required. If you are unsure of the stability of the banks seek technical assistance from SWCD or DEC.

APPENDIX C

Bank-full Hydraulic Geometry Tables for Selected Hydrologic Regions

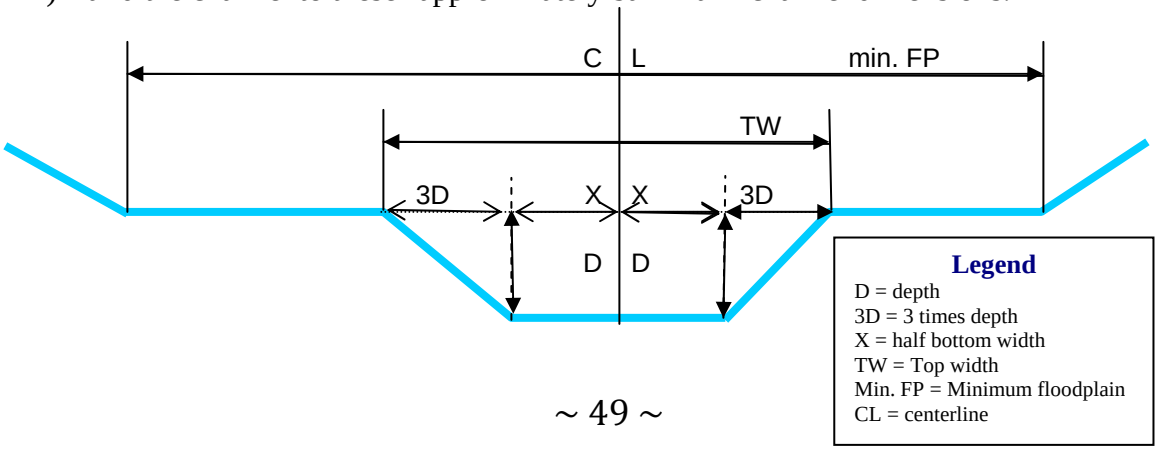
HYDROLOGIC REGION 1 (WESTERN ADIRONDACKS)

Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1	22.3	21.5	1.1	3:1	1.3	3.9	6.9	21.5	47.3
2.5	42.1	30.0	1.4	3:1	1.7	5.2	9.8	30.0	65.9
5	68.1	38.5	1.8	3:1	2.2	6.5	12.8	38.5	84.7
7.5	90.3	44.6	2.1	3:1	2.5	7.4	14.9	44.6	98.1
10	110.2	49.5	2.3	3:1	2.7	8.1	16.6	49.5	108.9
12.5	128.7	53.6	2.4	3:1	2.9	8.7	18.1	53.6	118.0
15	146.1	57.3	2.6	3:1	3.1	9.2	19.4	57.3	126.1
17.5	162.5	60.6	2.7	3:1	3.2	9.7	20.6	60.6	133.3
e20	178.3	63.6	2.8	3:1	3.4	10.1	21.7	63.6	139.9
22.5	193.5	66.4	3.0	3:1	3.5	10.5	22.7	66.4	146.0
25	208.2	68.9	3.1	3:1	3.6	10.9	23.6	68.9	151.7
27.5	222.4	71.4	3.2	3:1	3.7	11.2	24.5	71.4	157.0
30	236.3	73.6	3.2	3:1	3.8	11.5	25.3	73.6	162.0
32.5	249.8	75.8	3.3	3:1	3.9	11.8	26.1	75.8	166.8
35	263.0	77.9	3.4	3:1	4.0	12.1	26.8	77.9	171.3
37.5	275.9	79.8	3.5	3:1	4.1	12.4	27.5	79.8	175.7
40	288.5	81.7	3.6	3:1	4.2	12.7	28.2	81.7	179.8
42.5	300.9	83.5	3.6	3:1	4.3	12.9	28.9	83.5	183.8
45	313.1	85.3	3.7	3:1	4.4	13.2	29.5	85.3	187.6
47.5	325.0	87.0	3.8	3:1	4.5	13.4	30.1	87.0	191.3
50	336.8	88.6	3.8	3:1	4.5	13.6	30.7	88.6	194.9

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



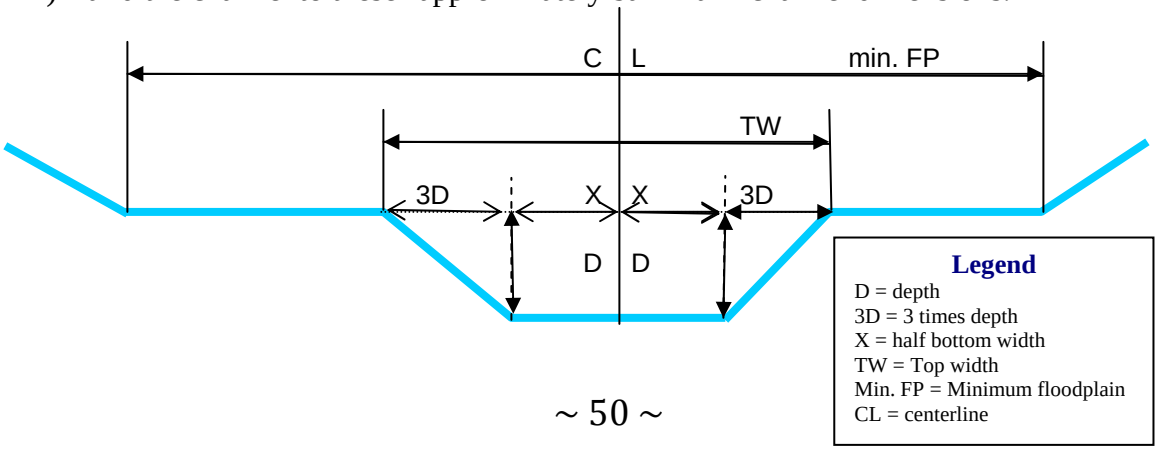
HYDROLOGIC REGION 2 (EASTERN ADIRONDACKS)

Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1	22.3	21.5	1.1	3:1	1.3	3.9	6.9	21.5	47.3
2.5	42.1	30.0	1.4	3:1	1.7	5.2	9.8	30.0	65.9
5	68.1	38.5	1.8	3:1	2.2	6.5	12.8	38.5	84.7
7.5	90.3	44.6	2.1	3:1	2.5	7.4	14.9	44.6	98.1
10	110.2	49.5	2.3	3:1	2.7	8.1	16.6	49.5	108.9
12.5	128.7	53.6	2.4	3:1	2.9	8.7	18.1	53.6	118.0
15	146.1	57.3	2.6	3:1	3.1	9.2	19.4	57.3	126.1
17.5	162.5	60.6	2.7	3:1	3.2	9.7	20.6	60.6	133.3
e20	178.3	63.6	2.8	3:1	3.4	10.1	21.7	63.6	139.9
22.5	193.5	66.4	3.0	3:1	3.5	10.5	22.7	66.4	146.0
25	208.2	68.9	3.1	3:1	3.6	10.9	23.6	68.9	151.7
27.5	222.4	71.4	3.2	3:1	3.7	11.2	24.5	71.4	157.0
30	236.3	73.6	3.2	3:1	3.8	11.5	25.3	73.6	162.0
32.5	249.8	75.8	3.3	3:1	3.9	11.8	26.1	75.8	166.8
35	263.0	77.9	3.4	3:1	4.0	12.1	26.8	77.9	171.3
37.5	275.9	79.8	3.5	3:1	4.1	12.4	27.5	79.8	175.7
40	288.5	81.7	3.6	3:1	4.2	12.7	28.2	81.7	179.8
42.5	300.9	83.5	3.6	3:1	4.3	12.9	28.9	83.5	183.8
45	313.1	85.3	3.7	3:1	4.4	13.2	29.5	85.3	187.6
47.5	325.0	87.0	3.8	3:1	4.5	13.4	30.1	87.0	191.3
50	336.8	88.6	3.8	3:1	4.5	13.6	30.7	88.6	194.9

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



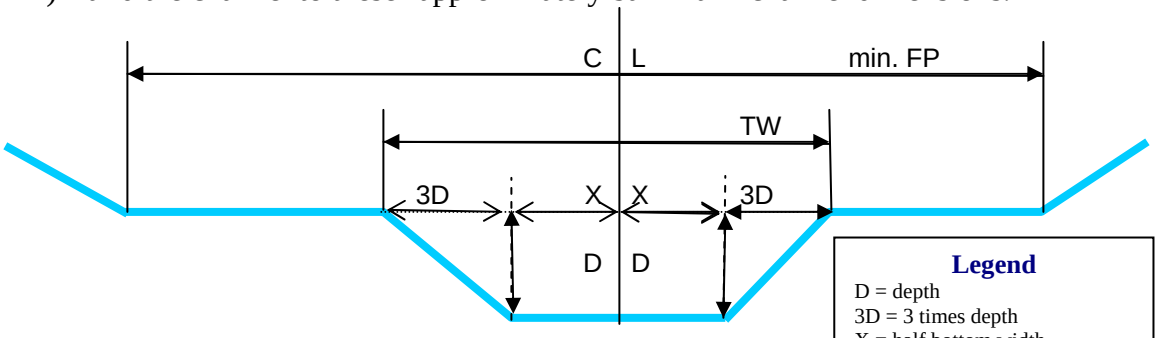
HYDROLOGIC REGION 3 (LOWER HUDSON)

Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1	39.8	24.0	1.7	3:1	2.4	7.1	4.9	24.0	52.8
2.5	63.1	31.4	2.0	3:1	2.7	8.2	7.5	31.4	69.0
5	89.4	38.4	2.3	3:1	3.1	9.2	10.0	38.4	84.5
7.5	109.7	43.2	2.5	3:1	3.3	9.8	11.8	43.2	95.1
10	126.7	47.0	2.7	3:1	3.5	10.4	13.1	47.0	103.4
12.5	141.8	50.2	2.8	3:1	3.6	10.8	14.3	50.2	110.4
15	155.4	52.9	2.9	3:1	3.7	11.1	15.3	52.9	116.4
17.5	167.9	55.4	3.0	3:1	3.8	11.5	16.2	55.4	121.8
e20	179.6	57.6	3.1	3:1	3.9	11.7	17.0	57.6	126.6
22.5	190.6	59.6	3.2	3:1	4.0	12.0	17.8	59.6	131.1
25	200.9	61.4	3.3	3:1	4.1	12.2	18.5	61.4	135.2
27.5	210.8	63.2	3.3	3:1	4.1	12.4	19.1	63.2	139.0
30	220.2	64.8	3.4	3:1	4.2	12.6	19.8	64.8	142.5
32.5	229.3	66.3	3.4	3:1	4.3	12.8	20.3	66.3	145.9
35	238.0	67.8	3.5	3:1	4.3	13.0	20.9	67.8	149.1
37.5	246.4	69.2	3.6	3:1	4.4	13.2	21.4	69.2	152.1
40	254.5	70.5	3.6	3:1	4.4	13.3	21.9	70.5	155.0
42.5	262.4	71.7	3.6	3:1	4.5	13.5	22.4	71.7	157.8
45	270.1	72.9	3.7	3:1	4.5	13.6	22.8	72.9	160.5
47.5	277.5	74.1	3.7	3:1	4.6	13.8	23.3	74.1	163.0
50	284.8	75.2	3.8	3:1	4.6	13.9	23.7	75.2	165.5

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



Legend
D = depth
3D = 3 times depth
X = half bottom width
TW = Top width
Min. FP = Minimum floodplain
CL = centerline

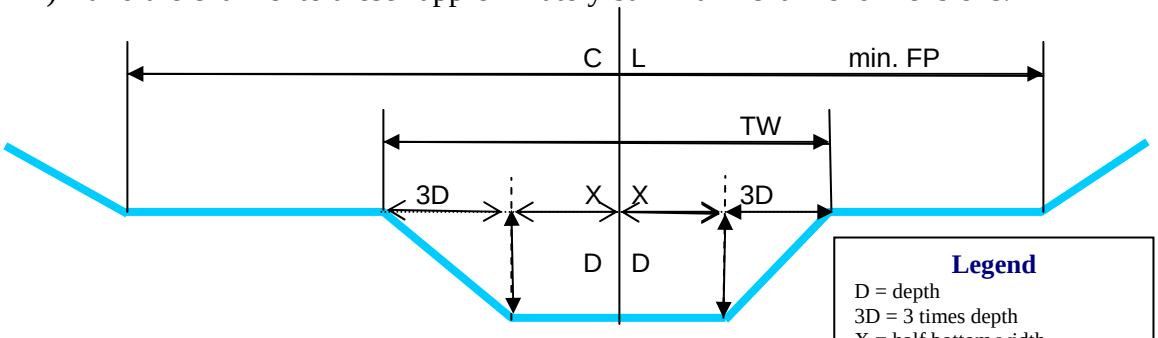
HYDROLOGIC REGION 4 (CATSKILLS EAST)

Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1	17.9	17.1	1.1	3:1	1.4	4.3	4.3	17.1	37.6
2.5	36.5	26.1	1.4	3:1	1.8	5.4	7.6	26.1	57.3
5	62.5	35.9	1.8	3:1	2.2	6.5	11.4	35.9	78.9
7.5	85.7	43.2	2.0	3:1	2.4	7.3	14.3	43.2	95.0
10	107.1	49.3	2.2	3:1	2.6	7.9	16.8	49.3	108.5
12.5	127.4	54.6	2.4	3:1	2.8	8.4	18.9	54.6	120.2
15	146.8	59.4	2.5	3:1	2.9	8.8	20.9	59.4	130.7
17.5	165.5	63.8	2.6	3:1	3.1	9.2	22.7	63.8	140.4
e20	183.5	67.8	2.7	3:1	3.2	9.6	24.3	67.8	149.2
22.5	201.1	71.6	2.8	3:1	3.3	9.9	25.9	71.6	157.6
25	218.3	75.2	2.9	3:1	3.4	10.2	27.4	75.2	165.4
27.5	235.1	78.5	3.0	3:1	3.5	10.5	28.8	78.5	172.8
30	251.5	81.7	3.1	3:1	3.6	10.8	30.1	81.7	179.8
32.5	267.7	84.8	3.2	3:1	3.7	11.0	31.4	84.8	186.6
35	283.5	87.8	3.3	3:1	3.7	11.2	32.6	87.8	193.1
37.5	299.1	90.6	3.3	3:1	3.8	11.5	33.8	90.6	199.3
40	314.5	93.3	3.4	3:1	3.9	11.7	35.0	93.3	205.3
42.5	329.7	96.0	3.5	3:1	4.0	11.9	36.1	96.0	211.1
45	344.7	98.5	3.5	3:1	4.0	12.1	37.2	98.5	216.7
47.5	359.5	101.0	3.6	3:1	4.1	12.3	38.2	101.0	222.2
50	374.1	103.4	3.7	3:1	4.2	12.5	39.2	103.4	227.5

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



Legend
D = depth
3D = 3 times depth
X = half bottom width
TW = Top width
Min. FP = Minimum floodplain
CL = centerline

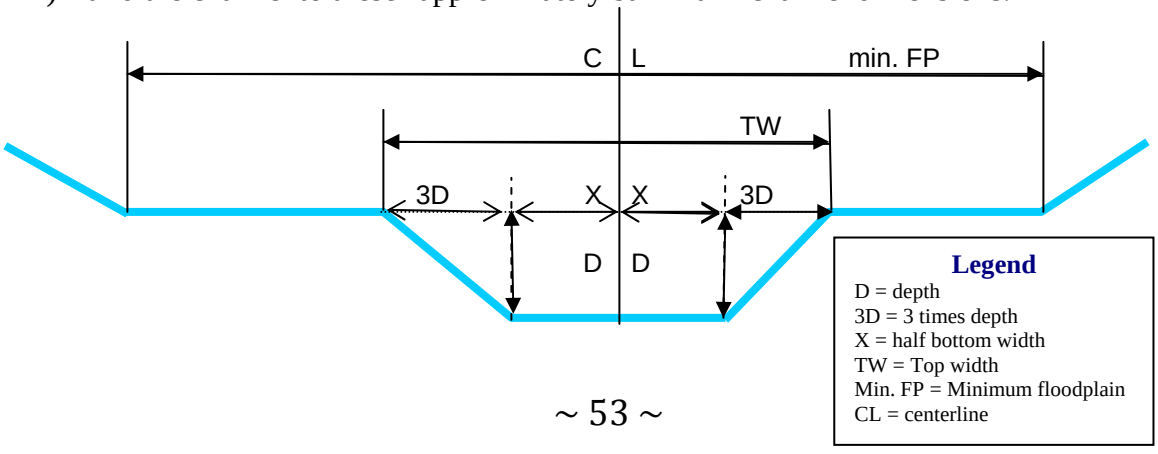
HYDROLOGIC REGION 4a (CATSKILLS WEST)

Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1	7.2	9.1	0.8	2:1	1.0	2.1	2.5	9.1	20.0
2.5	16.3	15.0	1.1	3:1	1.6	4.8	2.7	15.0	33.0
5	30.4	21.9	1.4	3:1	1.9	5.6	5.3	21.9	48.1
7.5	43.6	27.3	1.6	3:1	2.1	6.2	7.4	27.3	60.0
10	56.4	31.9	1.8	3:1	2.2	6.7	9.2	31.9	70.2
12.5	68.9	36.0	1.9	3:1	2.4	7.2	10.9	36.0	79.3
15	81.1	39.8	2.0	3:1	2.5	7.5	12.4	39.8	87.6
17.5	93.0	43.3	2.2	3:1	2.6	7.9	13.8	43.3	95.3
e20	104.8	46.6	2.3	3:1	2.7	8.2	15.1	46.6	102.5
22.5	116.5	49.7	2.3	3:1	2.8	8.5	16.3	49.7	109.2
25	128.0	52.6	2.4	3:1	2.9	8.8	17.5	52.6	115.7
27.5	139.3	55.4	2.5	3:1	3.0	9.0	18.7	55.4	121.9
30	150.6	58.1	2.6	3:1	3.1	9.3	19.8	58.1	127.8
32.5	161.8	60.7	2.7	3:1	3.2	9.5	20.8	60.7	133.5
35	172.9	63.2	2.7	3:1	3.2	9.7	21.9	63.2	139.0
37.5	183.9	65.6	2.8	3:1	3.3	9.9	22.9	65.6	144.3
40	194.8	67.9	2.9	3:1	3.4	10.1	23.8	67.9	149.5
42.5	205.6	70.2	2.9	3:1	3.4	10.3	24.8	70.2	154.5
45	216.4	72.5	3.0	3:1	3.5	10.5	25.7	72.5	159.4
47.5	227.1	74.6	3.1	3:1	3.6	10.7	26.6	74.6	164.2
50	237.8	76.7	3.1	3:1	3.6	10.9	27.5	76.7	168.8

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



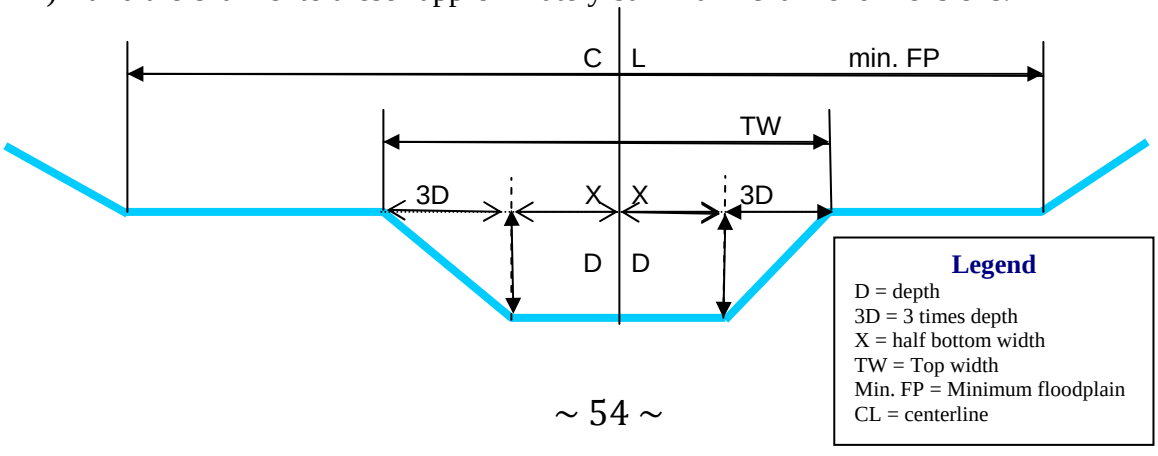
HYDROLOGIC REGION 5 (SUSQUEHANNA)

Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1.0	10.8	13.5	0.8	3:1	1.1	3.2	3.5	13.5	29.7
2.5	23.0	20.4	1.2	3:1	1.5	4.4	5.8	20.4	44.8
5.0	40.6	27.8	1.5	3:1	1.9	5.6	8.3	27.8	61.2
7.5	56.7	33.4	1.7	3:1	2.2	6.5	10.2	33.4	73.4
10.0	71.8	38.0	1.9	3:1	2.4	7.2	11.8	38.0	83.5
12.5	86.3	42.0	2.1	3:1	2.6	7.7	13.2	42.0	92.3
15.0	100.3	45.5	2.3	3:1	2.7	8.2	14.5	45.5	100.2
17.5	113.9	48.8	2.4	3:1	2.9	8.7	15.7	48.8	107.4
20.0	127.1	51.8	2.5	3:1	3.0	9.1	16.8	51.8	114.0
22.5	140.0	54.6	2.6	3:1	3.2	9.5	17.8	54.6	120.2
25.0	152.7	57.3	2.7	3:1	3.3	9.9	18.8	57.3	126.0
27.5	165.2	59.8	2.8	3:1	3.4	10.2	19.7	59.8	131.5
30.0	177.5	62.2	2.9	3:1	3.5	10.5	20.6	62.2	136.8
32.5	189.5	64.4	3.0	3:1	3.6	10.8	21.4	64.4	141.8
35.0	201.5	66.6	3.1	3:1	3.7	11.1	22.2	66.6	146.6
37.5	213.2	68.7	3.2	3:1	3.8	11.4	23.0	68.7	151.2
40.0	224.9	70.7	3.2	3:1	3.9	11.7	23.7	70.7	155.6
42.5	236.4	72.7	3.3	3:1	4.0	11.9	24.4	72.7	159.9
45.0	247.8	74.6	3.4	3:1	4.1	12.2	25.1	74.6	164.1
47.5	259.0	76.4	3.5	3:1	4.1	12.4	25.8	76.4	168.1
50.0	270.2	78.2	3.5	3:1	4.2	12.6	26.5	78.2	172.0

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



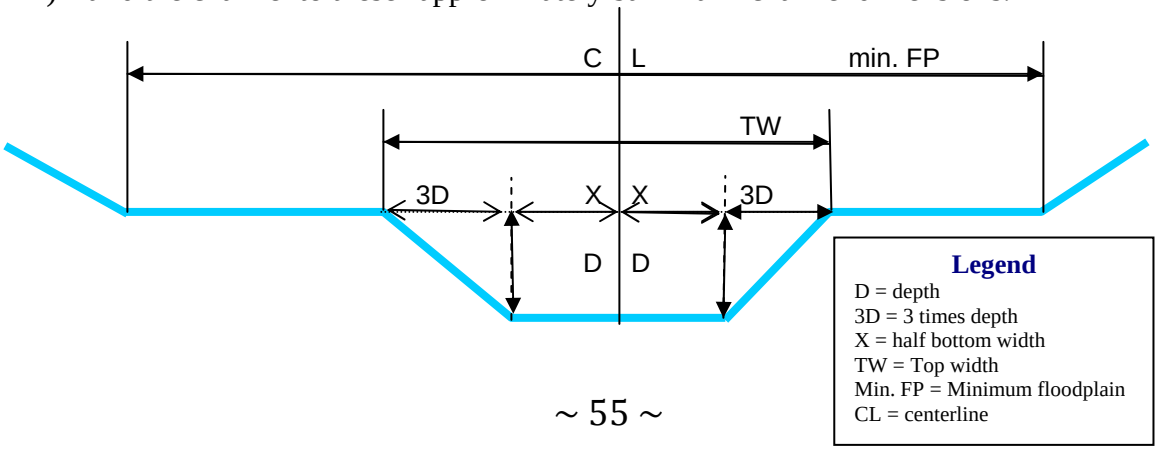
HYDROLOGIC REGION 6 (SOUTHERN TIER)

Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1	17.6	16.9	1.0	3:1	1.4	4.1	4.3	16.9	37.2
2.5	32.3	24.8	1.3	3:1	1.6	4.8	7.6	24.8	54.6
5	51.1	33.2	1.5	3:1	1.8	5.5	11.0	33.2	73.0
7.5	66.8	39.3	1.7	3:1	2.0	6.0	13.6	39.3	86.5
10	80.8	44.3	1.8	3:1	2.1	6.4	15.8	44.3	97.6
12.5	93.7	48.7	1.9	3:1	2.2	6.7	17.6	48.7	107.1
15	105.7	52.6	2.0	3:1	2.3	7.0	19.3	52.6	115.6
17.5	117.1	56.1	2.1	3:1	2.4	7.2	20.8	56.1	123.4
e20	127.9	59.3	2.2	3:1	2.5	7.4	22.2	59.3	130.4
22.5	138.2	62.3	2.2	3:1	2.5	7.6	23.6	62.3	137.0
25	148.2	65.1	2.3	3:1	2.6	7.8	24.8	65.1	143.2
27.5	157.9	67.8	2.3	3:1	2.6	7.9	25.9	67.8	149.1
30	167.3	70.3	2.4	3:1	2.7	8.1	27.1	70.3	154.6
32.5	176.4	72.7	2.4	3:1	2.7	8.2	28.1	72.7	159.9
35	185.2	75.0	2.5	3:1	2.8	8.4	29.1	75.0	164.9
37.5	193.9	77.2	2.5	3:1	2.8	8.5	30.1	77.2	169.8
40	202.3	79.3	2.6	3:1	2.9	8.6	31.0	79.3	174.4
42.5	210.6	81.3	2.6	3:1	2.9	8.7	31.9	81.3	178.9
45	218.7	83.3	2.6	3:1	2.9	8.8	32.8	83.3	183.2
47.5	226.7	85.2	2.7	3:1	3.0	8.9	33.7	85.2	187.4
50	234.5	87.0	2.7	3:1	3.0	9.0	34.5	87.0	191.5

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



HYDROLOGIC REGION 7 (LAKE PLAINS)

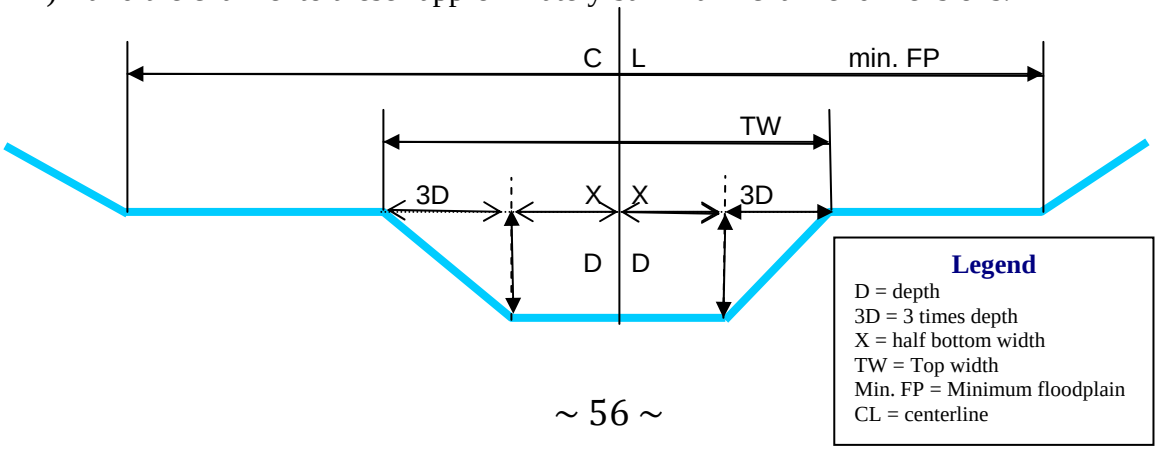
Bank-full Hydraulic Geometry vs. Drainage Area for Selected Hydrologic Regions

				Construction Dimensions					
DA (sq. mile)	Bankfull Area (sq. ft)	Bankfull Width (ft)	Bankfull Depth (ft)	channel bank side slope	D (ft)	3D (ft)	X (ft)	TW (ft)	Min. FP (ft)
1	15.9	10.8	1.5	2:1	2.3*	4.6*	1.3*	10.8	23.8
2.5	29.0	16.4	1.8	2:1	3.2*	6.4*	1.7*	16.4	36.1
5	45.7	22.6	2.0	2:1	3.4*	6.8*	3.3*	22.6	49.7
7.5	59.6	27.2	2.2	3:1	3.5*	10.2*	3.7*	27.2	59.8
10	72.0	31.0	2.3	3:1	3.5	10.6	4.9	31.0	68.2
12.5	83.4	34.3	2.4	3:1	3.5	10.5	6.7	34.3	75.5
15	94.0	37.3	2.5	3:1	3.5	10.5	8.1	37.3	82.1
17.5	104.0	40.1	2.6	3:1	3.5	10.6	9.4	40.1	88.1
e20	113.5	42.6	2.7	3:1	3.6	10.7	10.6	42.6	93.7
22.5	122.6	44.9	2.7	3:1	3.6	10.8	11.7	44.9	98.9
25	131.4	47.2	2.8	3:1	3.6	10.9	12.7	47.2	103.8
27.5	139.8	49.3	2.8	3:1	3.7	11.0	13.7	49.3	108.4
30	148.0	51.3	2.9	3:1	3.7	11.1	14.6	51.3	112.8
32.5	156.0	53.2	2.9	3:1	3.7	11.2	15.4	53.2	117.0
35	163.8	55.0	3.0	3:1	3.7	11.2	16.3	55.0	121.1
37.5	171.4	56.8	3.0	3:1	3.8	11.3	17.1	56.8	125.0
40	178.8	58.5	3.1	3:1	3.8	11.4	17.8	58.5	128.7
42.5	186.0	60.1	3.1	3:1	3.8	11.5	18.6	60.1	132.3
45	193.2	61.7	3.1	3:1	3.9	11.6	19.3	61.7	135.8
47.5	200.1	63.3	3.2	3:1	3.9	11.7	20.0	63.3	139.2
50	207.0	64.8	3.2	3:1	3.9	11.7	20.7	64.8	142.6

* values were estimated

Instructions:

1) Select the table for the drainage basin that your project is in.
2) Select the drainage area (DA) in the selected table that most closely matches the DA at your project site.
3) Under "Construction Dimensions" read the channel dimensions tabulated.
4) Build the channel to these "approximately bank-full" channel dimensions.



APPENDIX D

How to Use USGS New York Streamstats web tool

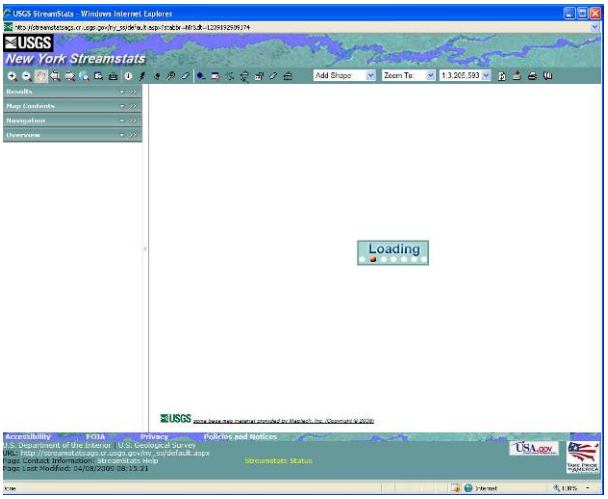
How to use the USGS New York StreamStats Web Tools to Calculate Watershed Area (WA)

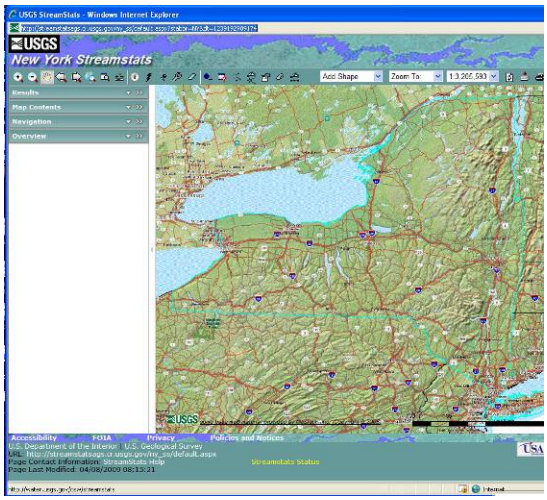
Acquiring the watershed area in square miles (area upstream of a location on a stream) is key for using the Regional Tables of Hydraulic Geometry for determining the bank-full dimensions of a channel. Until recently, the time needed to calculate watershed area was a major impediment to using the tables. USGS has recently developed an excellent tool for this calculation and it is openly available on the internet.

To use this tool you will need high speed internet access. Even with high speed internet access this program can be slow to load. If the process hangs up in loading mode, get out and re-connect to the site. Patience is needed.

Step 1: Navigate to the USGS StreamStats page for New York. This is the current link to the site: http://streamstatsags.cr.usgs.gov/ny_ss/index.htm

When you connect to the site the program will start up and you will get this "loading" screen.

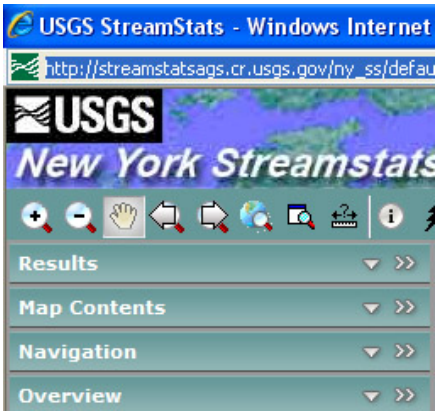


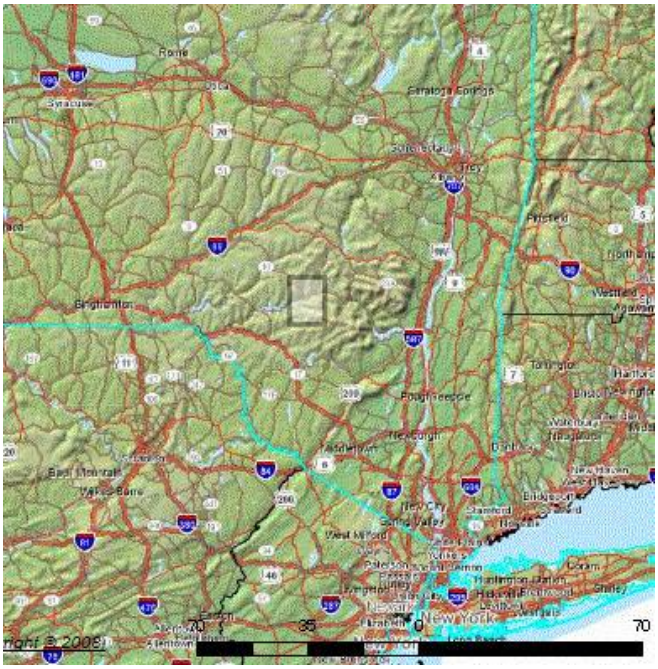


Once fully loaded you will get this screen. If it does not load you may need to temporarily turn off any "pop up blockers" your computer virus protection software uses.

Step 2: Zoom to the area of interest

Select the zoom in button in the upper left of the screen. Zoom in is the magnifier glass icon with the plus sign in the center. Single click on the icon will activate this tool.

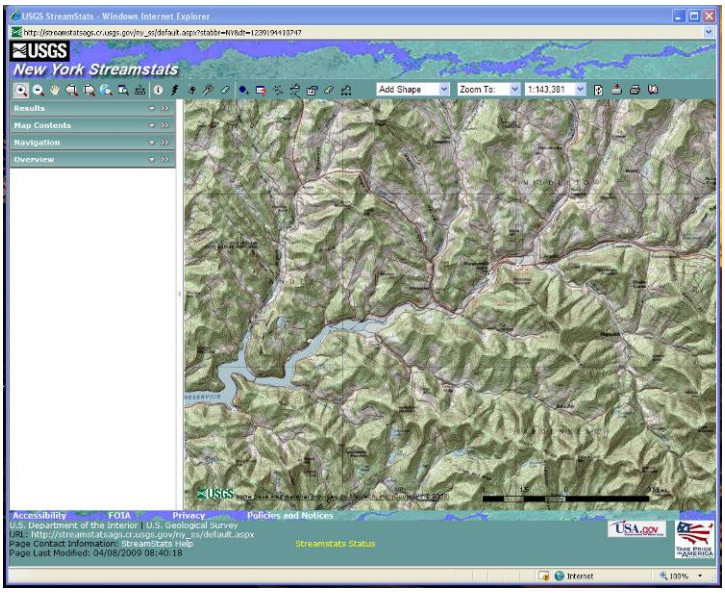




To zoom in you are going to create a drag box. Hold down the left mouse button on a point on the map to the north and west of the area of interest, and while keeping the button held down, move the mouse to the south and east so that a box is created around the area of interest. Release the left mouse button to complete the box (see the gray area in the image to the left). The program will zoom in to the extent of the box.

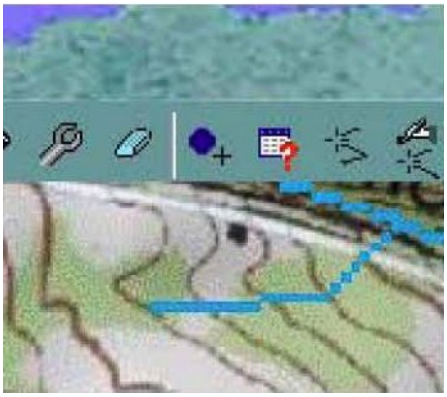
This will be your first zoom in extent.

You will probably have to repeat this process until you get fully zoomed into the project site. With the site centered in the map frame you can also use the scale pull down to set the scale to about 1:10,000. This scale will enable you to accurately use the point delineation tool. *Don't zoom in too far as the application may hang up in the loading mode.*

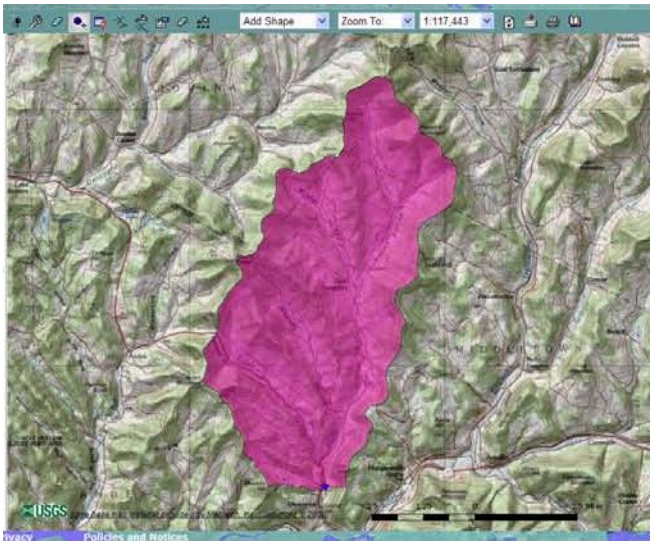


Step 3: Use the Watershed delineation from a point tool to select the location of interest

Use the button with the grey dot and plus sign to select the point on the stream where you wish to calculate the watershed area.

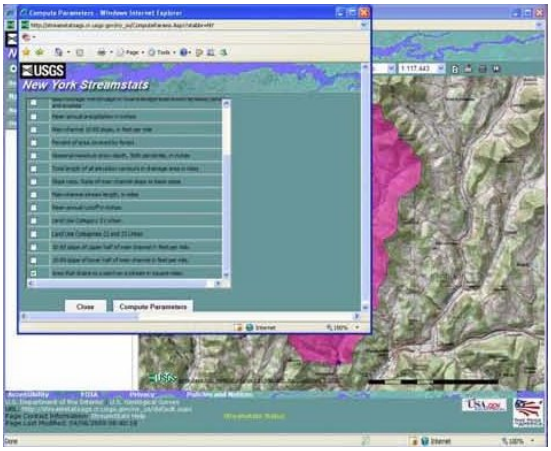


Single click on the icon to make it active. You will note that the stream appears as a series of connected light blue cells (pixels). Select the cell on the stream that you wish to be the lowest point on the watershed. This is also called the "pour point". You will determine the total upstream area contributing flow to this point on the stream. The program will then outline the watershed area contributing flow to this point.



Step 4: Calculate Watershed Area

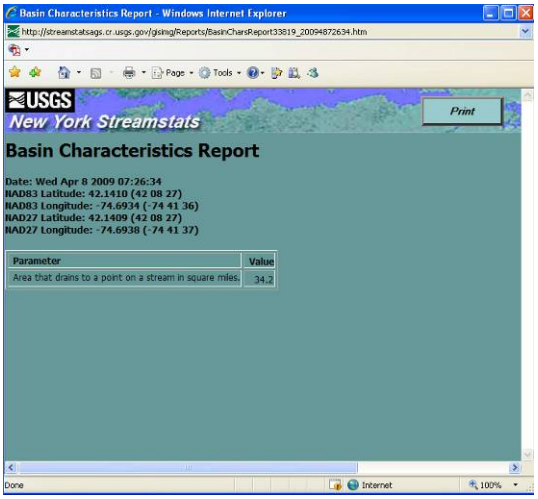
Use the Basin Characteristics icon (rectangular box with red question mark located to the right of the point delineation icon) to generate a report of the basin's characteristics. To use the tool simply single click the icon and a check box will appear on your screen.



The tool will calculate numerous statistics for the basin. To save time, uncheck all of the boxes except the box labeled "Area that drains to a point on a stream in square miles" Then left mouse button click on "Compute Parameters"

The program will compute the area.

There are numerous help screens available for use with this tool. To access the instructions left click on the top bar (aqua blue area near where the USGS agency block). A window will open with a table of contents located on the left. Click on the User Instructions hyperlink to access the instructions.



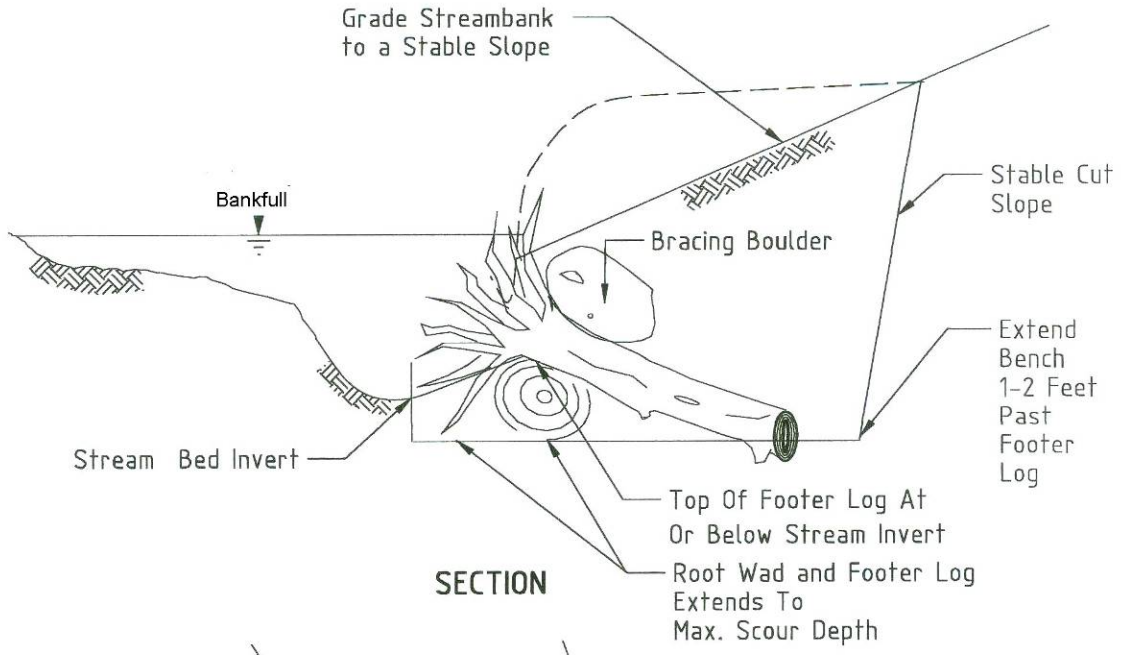
Many thanks to Martyn Smith and the GIS staff at USGS Troy office for their efforts to create this excellent application. We especially acknowledge the contributions of Barry Baldigo, Fisheries Biologist of USGS who helped make this application available for our use.

APPENDIX E

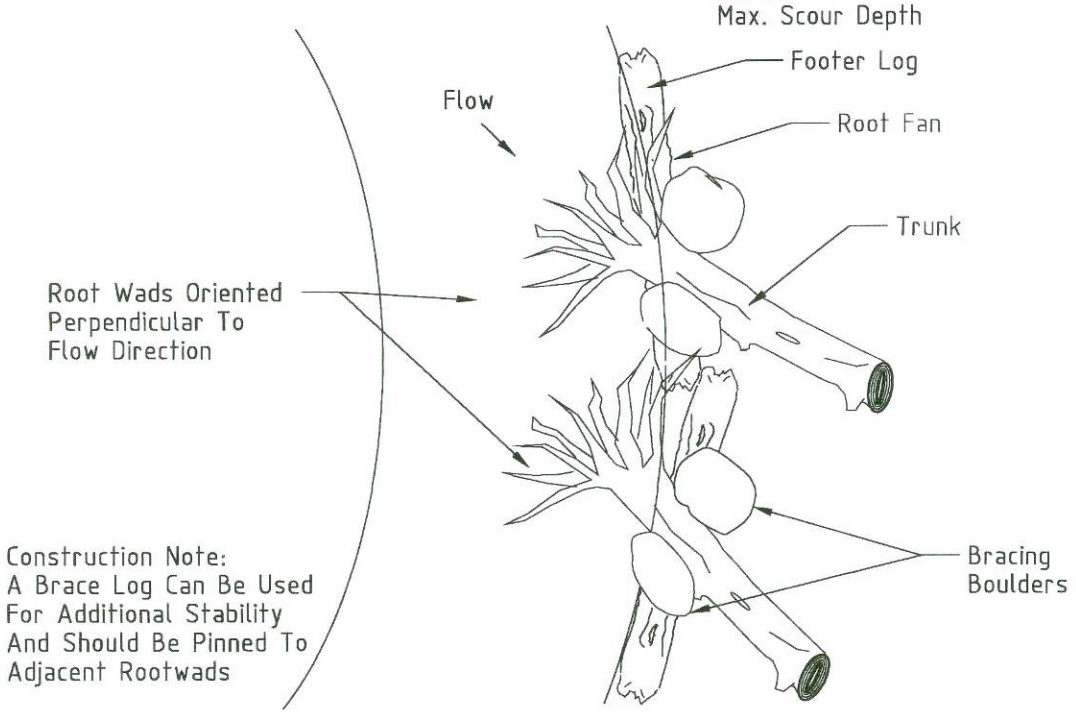
Root Wad Detail

The Virginia Stream Restoration & Stabilization Best Management Practices Guide

DETAIL 1.2: ROOT WAD REVETMENT



SECTION



PLAN

Section & Plan Views Adapted From Rosgen (1999)

BANK PROTECTION GUIDELINES	DECEMBER 2003	VIRGINIA DEPARTMENT OF CONSERVATION RECREATION

APPENDIX F

Stream Disturbance Permit Regulations in Natural Disasters

Stream Disturbance Permit Regulations in Natural Disasters under New York's Environmental Conservation Law.

NYCRR Part §608.2 Disturbance of Protected Streams

(a) *Permit required.* Except as provided in subdivision (b) of this section, no person or local public corporation may change, modify or disturb any protected stream, its bed or banks, nor remove from its bed or banks sand, gravel or other material, without a permit issued pursuant to this Part.

(b) *Exceptions.* The requirement of a permit pursuant to subdivision (a) of this section does not apply to the following:

(1) a local public corporation that has entered into a written memorandum of understanding with the department establishing the plan of operation that will be followed in conducting any activity described in subdivision (a) of this section that will afford proper protection to the public beneficial uses of protected streams and navigable waters of the state; or

(2) any person actively cultivating land devoted to agriculture, whether or not such land is along a protected stream, provided that this exception shall be limited to agricultural activities consisting only of the crossing and recrossing of a protected stream by livestock or wheeled farming equipment normally used for traditional agricultural purposes or of withdrawing irrigation water in a manner which does not otherwise alter the stream.

§608.8 Standards

The basis for the issuance or modification of a permit will be a determination that the proposal is in the public interest, in that:

(a) the proposal is reasonable and necessary;

(b) the proposal will not endanger the health, safety or welfare of the people of the State of New York; and

(c) the proposal will not cause unreasonable, uncontrolled or unnecessary damage to the natural resources of the state, including soil, forests, water, fish, shellfish, crustaceans and aquatic and land-related environment.

§621.12 Emergency authorizations.
For projects carried out in response to an emergency, the following procedures shall apply:

(a) All procedural requirements of this Part related to application processing are waived, except as provided in this section.

(b) Prior to commencement of an emergency action or project, the department must be notified, as specified in subdivision (d) below, and must determine whether to deny or grant approval pursuant to subdivision (e) of this section.

(c) If circumstances warrant immediate action by a state or local government agency or a public benefit corporation and prior notice to the department is not possible, that agency or corporation may proceed to undertake the emergency action but must then notify the department within 24 hours after commencement of the project. The department must subsequently respond pursuant to subdivision (f) of this section.

(d) Notification pursuant to subdivisions (b) or (c) above may be by certified mail, telegram, mailgram, facsimile (FAX), electronically or a written form of communication to the appropriate regional permit administrator as listed in section 621.19 of this Part. This notification must include submission of the following information:

(1) a description of the proposed action;

(2) location map and plan of the proposed project;

(3) reasons why the situation is an emergency based on the immediate protection of life, health, general welfare, property or natural resources;

(4) actions to be taken to minimize environmental impacts; and

(5) any additional information requested by the department necessary to make a finding of emergency.

(e) Prior to issuing an emergency authorization, the department must:

(1) make a finding of emergency stating that the action is an emergency as defined in Section 621.2(j), why immediate action is needed and the consequences to life, health, general welfare, property or natural resources if the action is not immediately taken; and

(2) determine from the available information that the project will be carried out in a manner that will cause the least change, modification or adverse impact to life, health, property or natural resources. The department may attach conditions to emergency authorizations and enforce them to assure compliance with the

authorization and other regulatory standards that would apply to such actions absent an emergency.

(f) The department will issue a decision granting or denying the emergency authorization within two business days of receipt of the information required in subdivision (d) of this section in the form of a letter that may be facsimiled (FAXED), mailgramed or otherwise electronically sent to the applicant. The original letter must be mailed to the applicant.

(1) The emergency authorization must contain the department's finding of emergency. The finding of emergency must state why the department believes the emergency action is necessary based on the protection of life, health, general welfare, property or natural resources.

(2) The denial of emergency authorization must contain the department's reasons why it has determined the activity does not constitute an emergency.

(g) An emergency authorization may be issued for a term not to exceed 30 calendar days. It may be renewed for one term not to exceed 30 calendar days. On or before 60 calendar days after the department's original approval, the project must be concluded or the authorized person must file a complete application for any necessary permit with the department. The application will be subject to all the procedural requirements of this Part. If the application for a permit is timely and complete the permittee may continue working pursuant to the emergency authorization until the permit is issued.

(h) The department may issue an order summarily suspending:

(1) an action begun before the grant of an emergency authorization, if the department finds that no emergency exists; or

(2) an emergency authorization, if the department finds that an action is no longer immediately necessary to protect life, health, property or natural resources.

Such action must cease immediately upon receipt of the order by the responsible party.

(i) A person who violates any provision of this section or any term or condition of an emergency authorization will be ordered to perform any required restoration or provide department authorized mitigation of environmental damage resulting from that action. In the event that the person fails to undertake the work ordered, the department or its agent may enter upon the lands or waters where the action took place and perform restoration or other activities necessary to mitigate or eliminate environmental damage caused by the action. If the department undertakes the remedial action, or causes it to be undertaken, the full cost for the work will be

charged to and be the responsibility of the person who failed to satisfy the provisions of this section.

§621.14 Special provisions.

(c) The department may issue general permits to allow work to eliminate damage caused by natural disasters or extraordinary weather not unique to a particular locality, including repair or replacement in location and in kind of facilities which existed prior to the damage. Processing of such permits need not follow the full procedural requirements of this Part.

APPENDIX G

Maximum Pump Capacities

Pump Capacities

Pump Size	Max Capacity CFS	Max Capacity GPM
2"	0.5	216
3"	0.7	300
4"	1.6	700
6"	4.5	2000
8"	7	3200
10"	7.8	3500
12"	10	4500

Source: Godwind Pump, CD Series Dri-Prime

Note that these are theoretical maximum capacities. In the field, due to head losses, (losses through pipes, bends, changes in elevation, etc.), actual pumping capacity *will be less*.