Red Streams Blue:
A Sub-Watershed Approach to Restoring the Estuary

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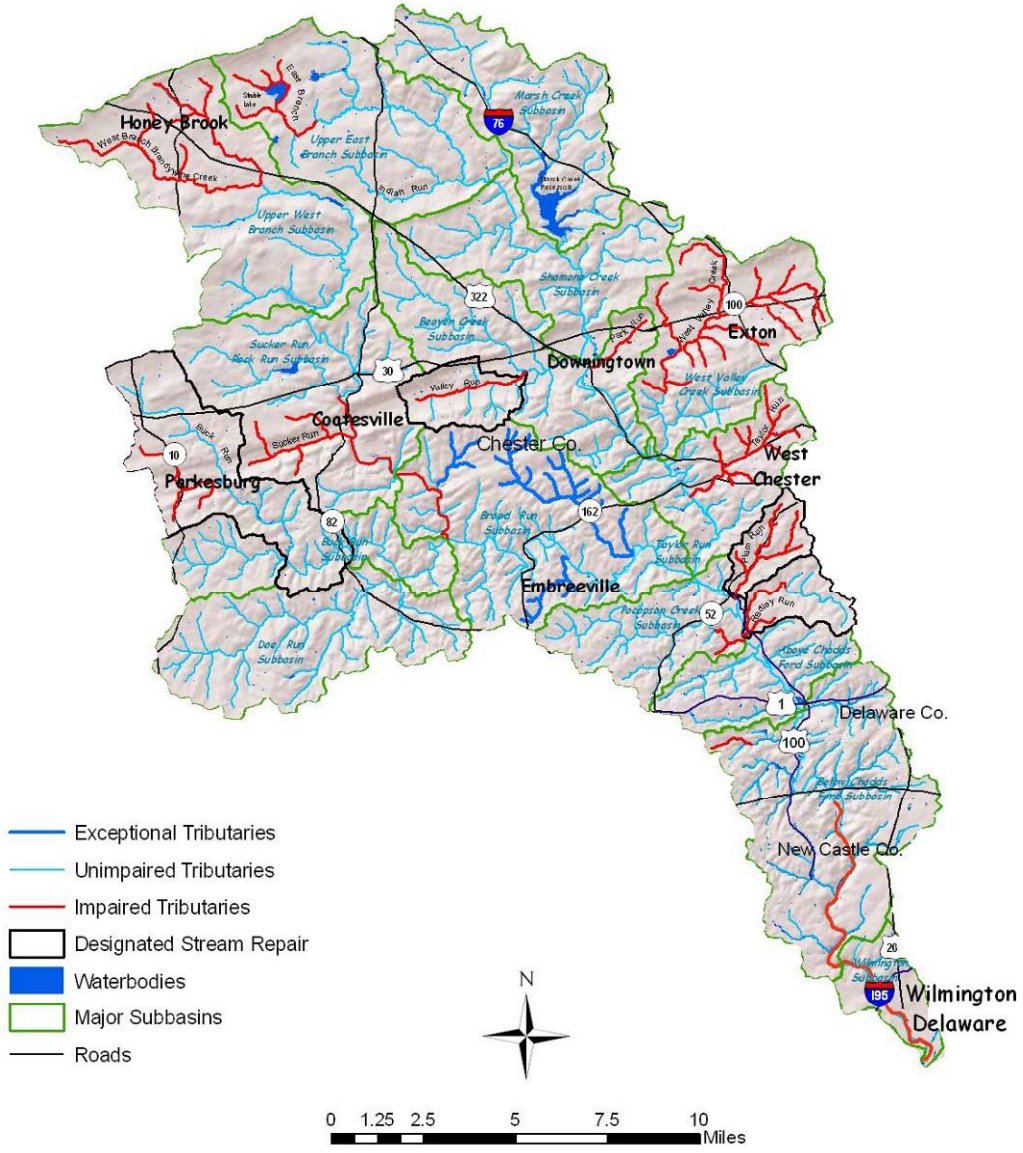
Watersheds of the Brandywine Valley



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What is the Red Streams Blue Program?

- 102 miles or 20% of the streams in the Brandywine Creek Watershed are designated impaired by Pennsylvania Department of Environmental Protection (DEP)
- Impaired streams are mapped in red and unimpaired waters are in blue.
- The goal of Red Streams Blue Program is to take actions to improve water quality and turn all Red Streams Blue.

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How will we make Red Streams Blue?

1. Review
   - Conduct a preliminary watershed review.
2. Assess
   - Conduct biological and habitat assessments at sample locations.
   - From assessments identify all impaired reaches and problems in the watershed.
3. Plan Restoration
   - Walk the stream and map outfalls, riparian buffers, areas of erosion and major areas of upland impacts.
   - Develop a restoration plan identifying areas for action, type of actions, the cost and the priority for the actions.
4. Act
   - Select restoration projects to implement. Determine partners and funding sources.
   - Implement projects and monitor water quality for improvements. Upgrade streams from red to blue

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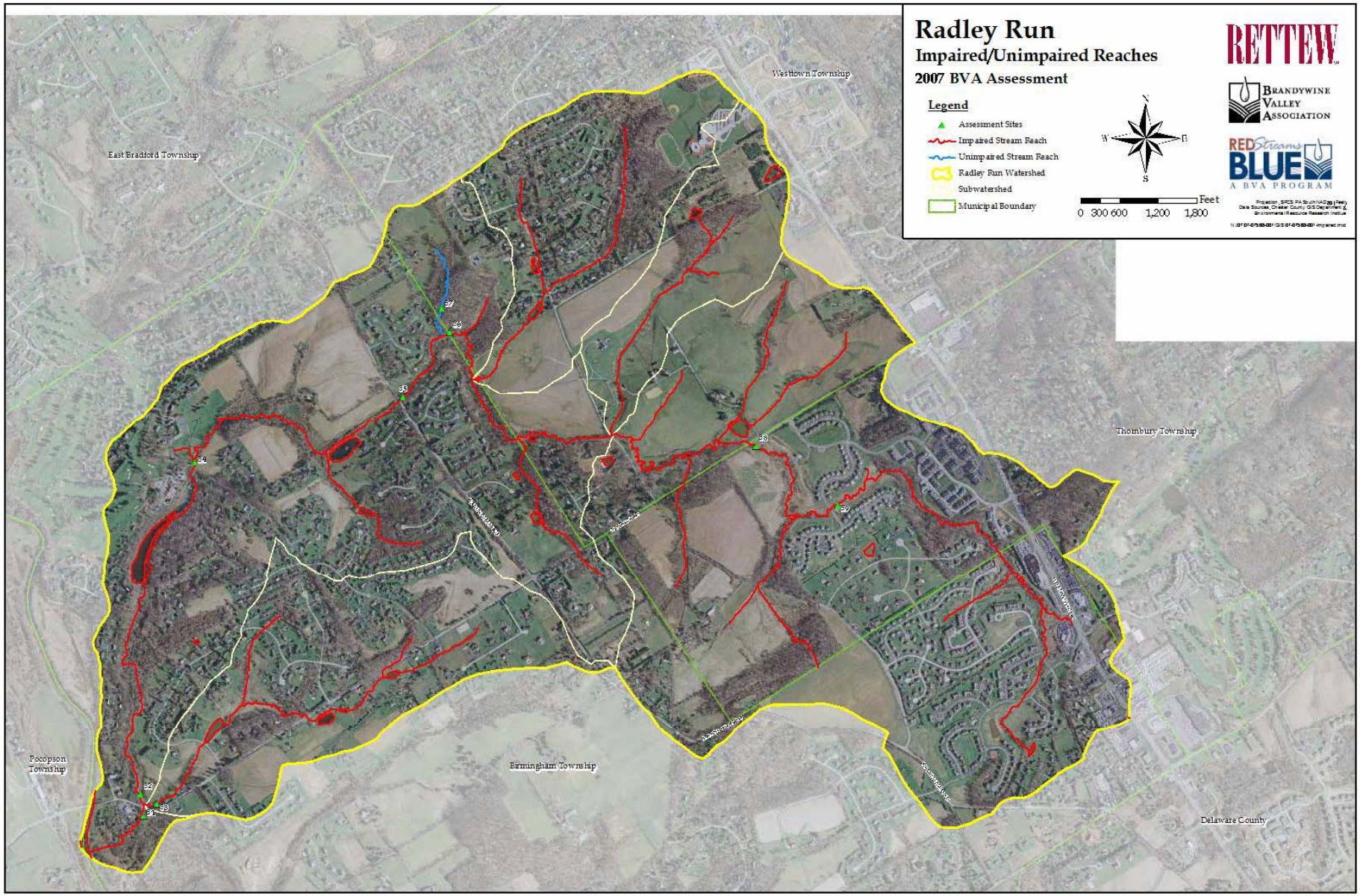
Radley Run
Impaired/Unimpaired Reaches
2007 BVA Assessment
Legend
Assessment Sites
Impaired Stream Reach
Unimpaired Stream Reach
Radley Run Watershed
Subwatershed
Municipal Boundary
N
W
E
S
Feet
0 300 600 1,200 1,800
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Westtown Township
East Bradford Township
Thornbury Township
Pocopson Township
Birmingham Township
Delaware County
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Linking Assessment and Restoration Plan

1. Considers entire watershed related to assessment
2. Restoration activities focus on improving Water Quality
3. Possible projects: riparian buffer enhancement, bank stabilization, basin retrofits, limiting stormwater (rain barrels, rain gardens), wetland and floodplain restorations.
4. Projects will require many partners: BVA, townships, boroughs, businesses, large landowners, homeowners associations and residents
5. Includes watershed resident education to promote stream stewardship

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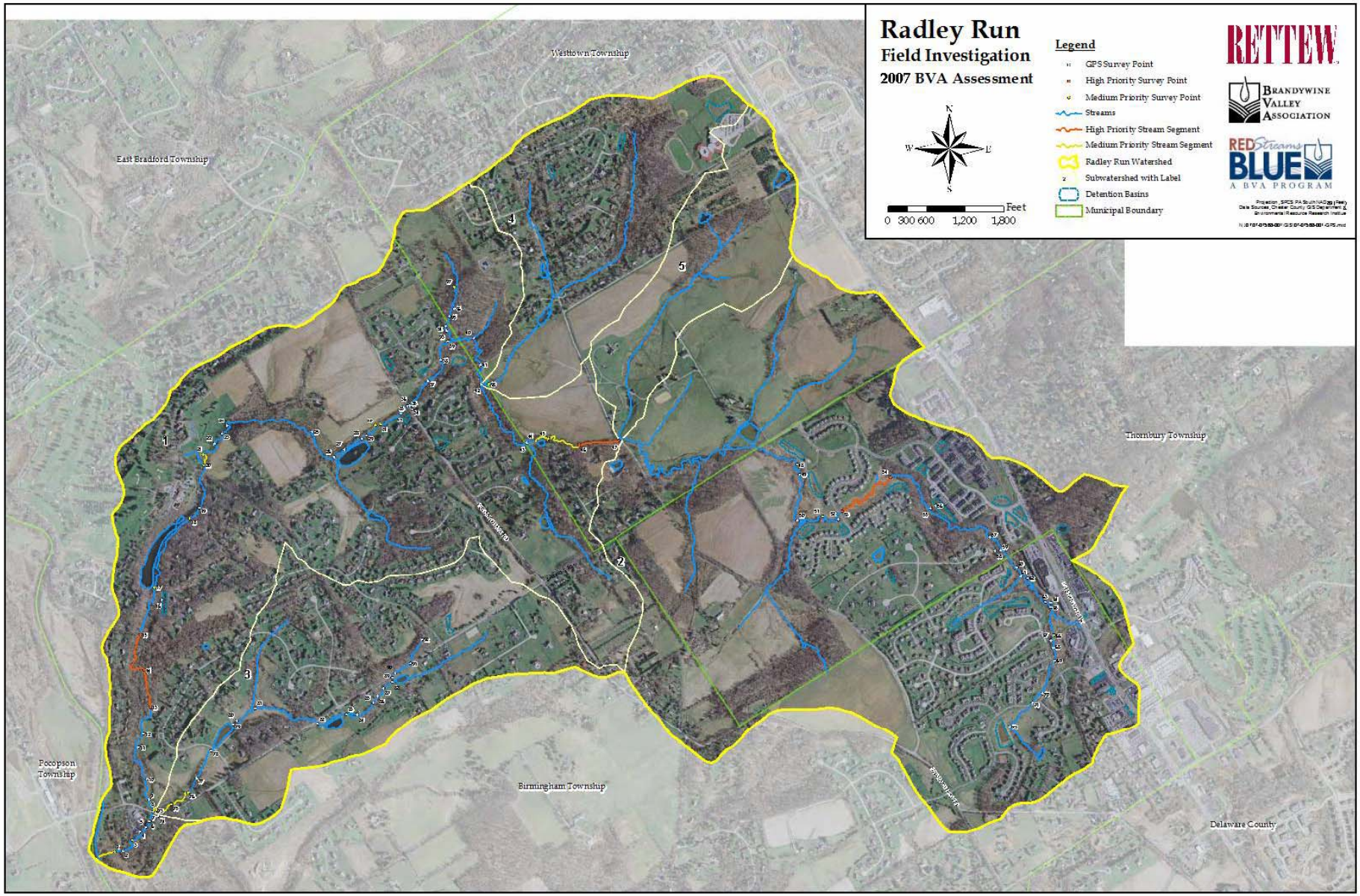

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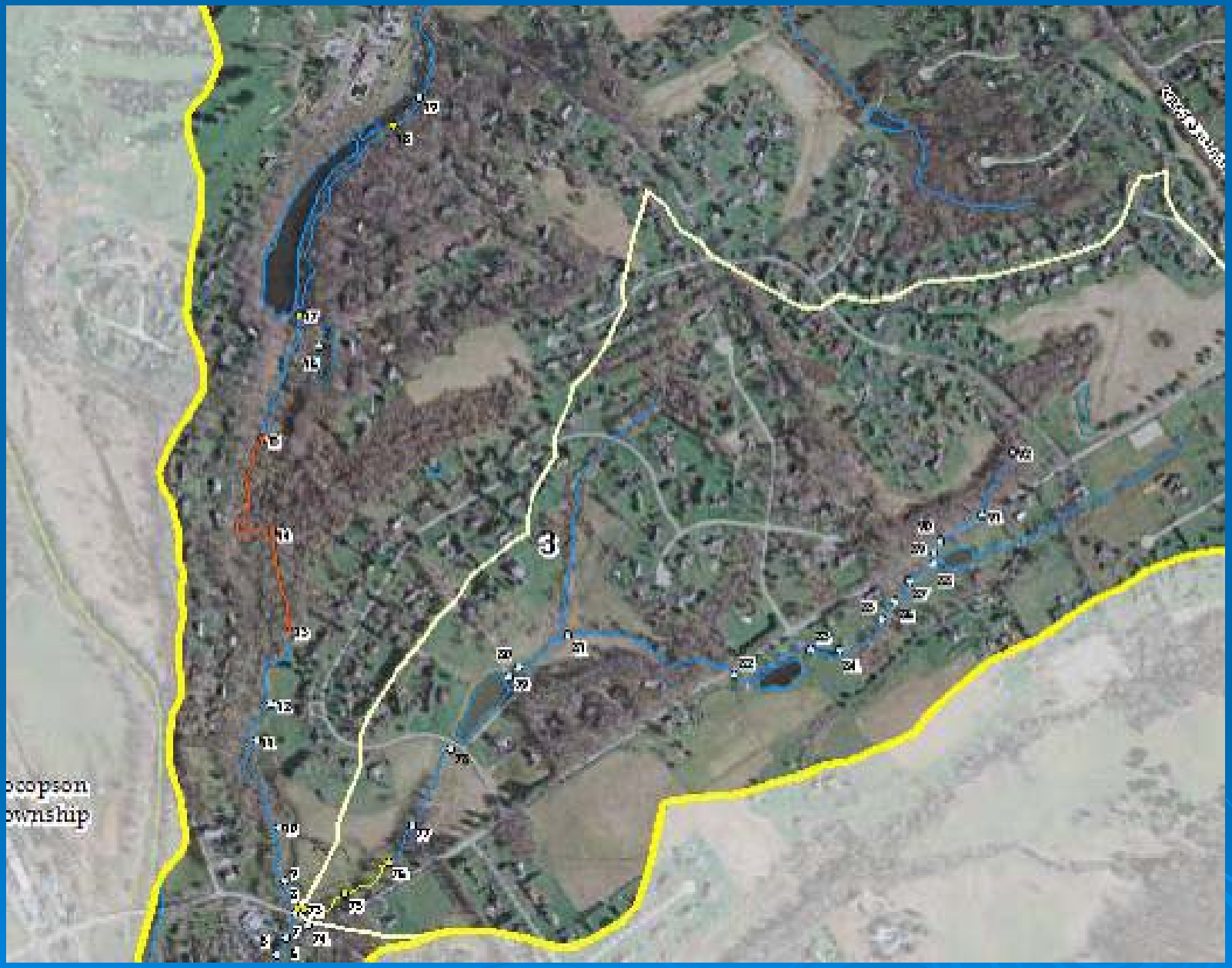

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Restoration Plan

	Description	Action Item	Key Partners	Red-Blue Priority	Comments
10	Upstream end of pasture. Begin open space. The stream channel in this area is incised appoximately 2 feet. Some tree plantings in this area would enhance the stream buffer.	Buffer Tree Plantings	BEST Landowner	Low Priority	
11	Start of BEST riparian buffer plantings. Would be great to extend the plantings to the edge of the pasture downstream.	Monitor buffer to document problems or success	BEST	Low Priority	
12	Concrete Pipe Outfall that is likely from a stormwater pipe. Pipe is approximately 80 percent blocked.	N/A	N/A	N/A	
13	Breached Dam Breast: Stream channel is incised approximately 3 feet below the dam breast and approximately 8 feet above the dam breast. Banks are Highly Eroded with little instream fish habitat. Yard Waste dump along the stream in this area is a minor concern in comparison to the eroding streambanks from the impacted channel.	Floodplain Restoration with Fluvial Geomorphology (FGM) techniques	Landowner Agencies BEST	High Priority	Most Expensive project in Study, Wetland Concerns, Permitting and Funding Constraints
14	Confluence with unnamed tributary 2 from the east. This point marks the upstream limit of the most degraded section of stream. The banks are incised approximately 4 feet in this area. Looking upstream, the stream begins to meander and vegetation covers approximately 50 percent of the banks. Ideally, restoration would continue upstream, but should be focused between this point and the breached dam breast.	Continuation of Floodplain Restoration and FGM project above	as above	as above	as above
15	Between points 22 and 23, the area is forested with 3-5 foot incised stream banks. There is a lack of instream fish habitat and the stream appears lacking in woody debris. While a large floodplain restoration project in this area may have the longest lasting impact, Instream habitat projects such as rock viens, boulder placements, and mud sills may greatly improve the fish habitat and stream function in this area for a substantially smaller expense. At the sample point, the stream buffer is cleared to the stream bank from one lot on the north side of the stream and is low priority. Much of this area contains invasive species that could be removed in coordination with the project.	Fish Habitat Improvement or Floodplain Restoration with FGM techniques	Landowner Agencies BEST	High Priority	Design and permitting needed, Access to the stream would need coordination
16	Concrete stormwater basin outfalls to stream on east bank. Invasive species in the basin could be replanted with natives. Not a major concern as the invasives are already throughout the watershed and this is likely not a source of invasion.	Invasive species removal.	Landowner	Low Priority	

Radley Run Watershed Preliminary Probable Construction Cost Opinion

Site	Min Cost	Max Cost
46-47	$25,000	$40,000
53-54	$60,000	$80,000
13-14	$110,000	$225,000
14-15	$40,000	$70,000
1	$15,000	$25,000
3	$7,500	$12,500
17	$15,000	$25,000
18	$4,500	$6,500
20-21	$10,000	$18,000
30-31	$8,500	$12,000
73-76	$1,000	$2,000
35	$20,000	$30,000
97	$5,500	$7,500
98	$2,000	$90,000
44-46	$1,500	$3,500
51	$8,000	$14,000
66	$15,000	$25,000
Total:	**$348,500**	**$686,000**

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Action

- With the plan as a guide, form action groups to move forward on selected projects.
- Action groups should consist of all partners including the municipality, funding source, landowner, & consultants.
- Implement! Implement! Implement!
- Monitor! Monitor! Monitor!

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By working together we can make a….

Red Stream

Blue

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For Information

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BRANDYWINE VALLEY ASSOCIATION

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