2012

Casco Bay Watershed Fish Barrier Priorities Atlas: Freeport

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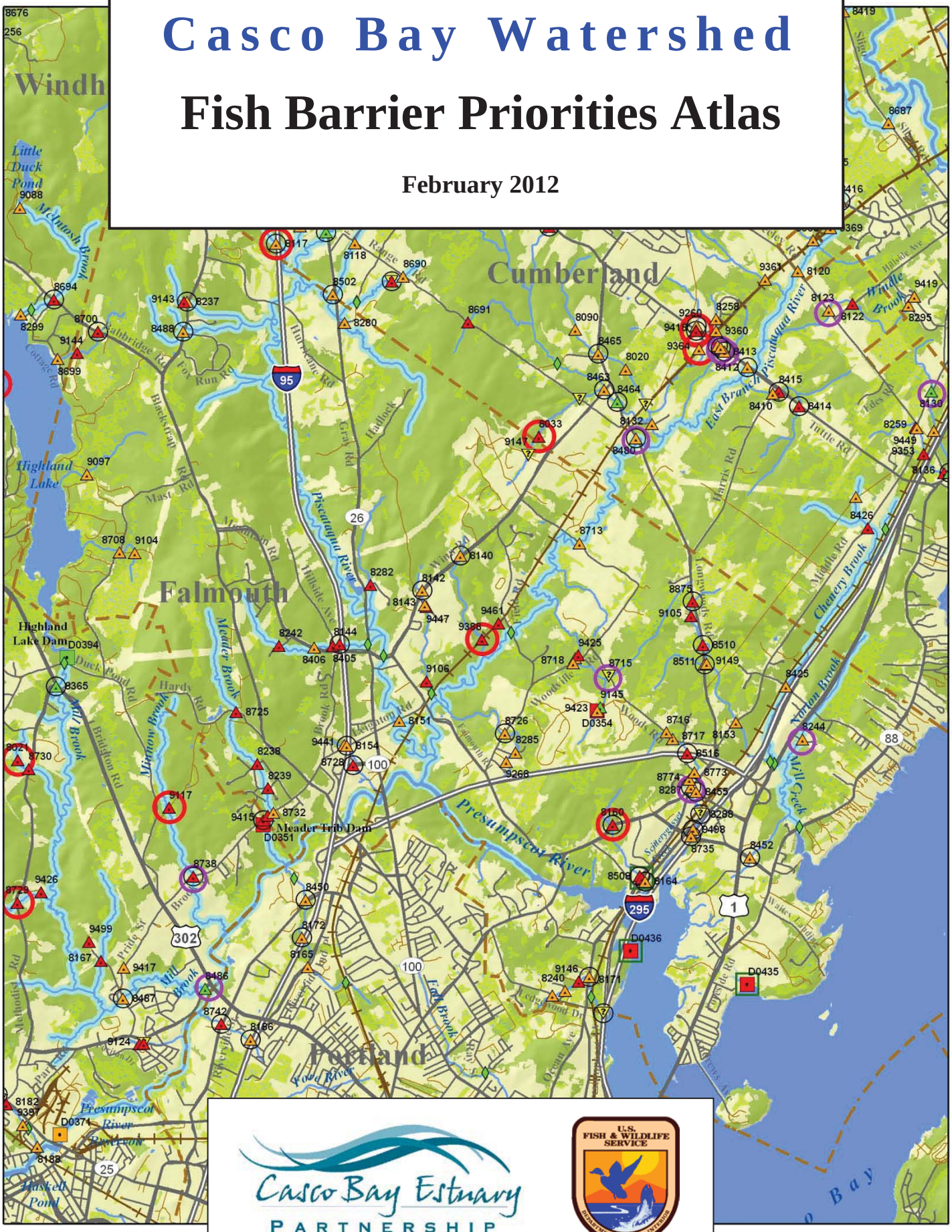
Casco Bay Watershed

Fish Barrier Priorities Atlas

February 2012



Casco Bay Watershed
Fish Barrier Priorities Atlas

March 2012

Background

This atlas was created to help guide restoration of streams affected by road-stream crossings and dams acting as barriers to fish passage in the Casco Bay watershed as part of a project coordinated by the Casco Bay Estuary Partnership (CBEP) and U.S. Fish and Wildlife Service Gulf of Maine Coastal Program (USFWS-GOMCP). The 42 individual town maps of the atlas contain crossings, dams and a small number of natural barriers identified during field surveys[1] of perennial streams in 2009 and 2010, and mapped using a geographic information system (GIS). Sites have been classified by the degree of restriction they represent for fish passage, and additional related data such as high priority stream habitat and flood hazards are shown in the maps to help identify priority sites. Data have been compiled into a database for use in analysis and mapping.

Although habitat needs for fish are best understood at the scale of whole streams, which bear little relationship to town boundaries, this atlas was created primarily for use by municipal public works employees and other staff and representatives focusing on local road systems. Therefore, each map page represents a town or city, and is shown at a scale suitable to include the entire community on one page. An index map shows the location of each town within the watershed, and a legend page provides explanation of symbols used on individual maps. Barriers from outside the Casco Bay watershed are shown where data are available, but masked to focus on the towns and portion of towns which are within the watershed.

Fish Barriers

Road-stream crossings are shown with SiteID numbers to help identify them in the barrier database. Dams, in most cases, have labels both of SiteID and the dam's common name, if one is known. *Severe* barriers are defined as those road/stream crossings where fundamental physical barriers exist at either the inlet or outlet of the crossing, including inlets or outlets "perched" above the stream channel, and inlets blocked at least 50%, usually by debris. *Potential* barriers cover a wide spectrum of road-stream crossing situations where fish passage problems are likely to exist at some flows for some species or age groups of fish, and passage of other aquatic organisms such as amphibians and macroinvertebrates is likely also limited. Sites that were inaccessible to survey crews, and therefore not surveyed, are shown as unsurveyed, but are included in our analysis as *Potential* barriers. Dams are classified by whether or not they have effective facilities in place to provide upstream fish passage. Natural barriers, including waterfalls, debris jams (including woody debris or rock and fine sediments), and beaver dams were assessed when in close proximity to surveyed crossings and dams, and are mapped as well.

Priority Streams

USFWS-GOMCP and CBEP staff consulted with state fisheries biologists to identify streams with important fish habitat, primarily for brook trout or Atlantic salmon, or both. These *priority streams* are highlighted on the maps. The scope of the road/stream crossing barrier assessment was limited to perennial streams, those with continuous flow year round. Although intermittent streams were not surveyed, fish using priority streams also rely on connectivity with intermittent tributaries at various times of year. There are likely to be additional barriers on important intermittent streams that have not been assessed.

Flood Hazards

The maps present data from Cumberland County Emergency Management Agency (CCEMA) and CBEP to show where flood hazards are likely to overlap with fish barriers. CCEMA, in cooperation with towns, has identified many road crossings as flood hazards based on past flood events. CCEMA sites are marked by purple circles, and do not always coincide with barrier survey sites because they may be located on intermittent streams or larger rivers crossed by bridges, which are generally passable for fish but may still entail flood hazards.

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[1] Field surveys were conducted based on protocols from the *Maine Road-Stream Crossing Survey Manual* (http://www.maine.gov/doc/mfs/fpm/water/docs/stream_crossing_2008/MaineRoad-StreamCrossingSurveyManual2008.pdf).

Where these sites do coincide with barriers, the combination of flood hazard with fish passage problems should place them high on any town's priority list for replacement.

A second set of flood hazard sites was derived from the barrier survey data by CBEP Director Curtis Bohlen. In CBEP's analysis, the capacity of each crossing was compared to the expected flows for that specific crossing during a 25-year flood event. Where sufficient crossing data exists, flows were calculated based on the relationship between drainage area above the crossing, and the proportion of the drainage area occupied by National Wetland Inventory-defined wetlands. CBEP flood hazard sites are shown as red circles, and represent all crossing sites where the capacity of the crossing was less than 50% of the expected 25-year flood value. This is meant as a general indication of flood risk, but may be incorrect in some locations based on site-specific factors. As with CCEMA sites above, where these sites coincide with barrier sites, the combination of flood hazard with fish passage problems should place them high on any town's priority list for review and possible replacement.

Other Data

Land use and wetland data are mapped to provide helpful landscape information, with upland forested areas distinguished from wetland, open, or developed areas. Public and private roads and railroads are included, as are all streams in the watershed, both perennial and intermittent. Relief shading is provided to help make reading the topography of the maps somewhat more intuitive. Tidal crossings, due to the increased complexity involved with crossing designs for two-way flow and maintenance of coastal wetlands, are denoted separately on the maps. Any town or other entity with plans to replace culverts at tidal crossings is invited to contact CBEP to explore partnership and grant funding opportunities. Town-based data summary tables for all barrier sites classified as *Severe* or *Potential* on high priority streams are provided following the maps. Each town has a two-page summary of key attributes from the database to provide information on location, dimensions and site conditions.

Data Sources

The data used to create this atlas came from a variety of sources. CBEP and USFWS-GOMC funded field surveys, with significant volunteer assistance from Trout Unlimited. Many resources were supplied by USFWS-GOMCP, including software, hardware, and data. Most barrier data was developed by USFWS-GOMCP from field survey data, though some was provided by the Kennebec Estuary Land Trust, which conducted surveys in the easternmost portion of the watershed. Flood hazard data is from either CCEMA, or from Curtis Bohlen's CBEP flood hazard analysis. Priority streams data was developed by USFWS-GOMCP, MDIFW, and the Maine Department of Marine Resources based on survey data of fish occurrences and habitat surveys. Basemap data, including relief shading, roads, town boundaries and most watershed polygons were supplied by the Maine Office of Geographic Information Systems. The roads data mapped is primarily from the Maine Department of Transportation dataset. Dam data is modified from original data from the Maine Department of Environmental Protection. Hydrography data came from high resolution National Hydrography Dataset (NHD).

Disclaimer

Please be aware that the data contained in the maps and tables of this atlas may contain errors, and represents the best information available at the time of publication. Note that crossing surveys were conducted in 2009 and 2010, and some sites surveyed may have undergone important changes based on flood events, maintenance or even entire replacement of a crossing. Likewise, flood hazard sites identified by CCEMA may have been modified based on previously planned work to lessen flooding problems.

For more information, please contact:

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Casco Bay Barriers by Town

Index Map

Casco Bay Barriers by Town

Legend

Crossing Barrier Type with SiteID

- 8235 Severe
- 8049 Potential
- 8731 Passable
- 9112 Unknown

Dams

- No Upstream Fish Passage
- Planned Upstream Fish Passage
- Upstream Fish Passage

- Bridge (Passable)
- Debris/Beaver Dam (Impassable)
- Waterfall (Impassable)
- MDOT Crossing
- Tidal Site
- Flood Hazard - Cumberland County EMA
- Flood Hazard - CBEP Analysis
- Priority Stream

Roads

- Private
- Public
- Highway
- Interstate

- Railroad
- Town Boundary
- Wetland
- Perennial Stream
- Intermittent Stream
- Rivers, Ponds & Coastal Waters
- Watershed Boundary
- Forested Lands
- Open or Developed Lands

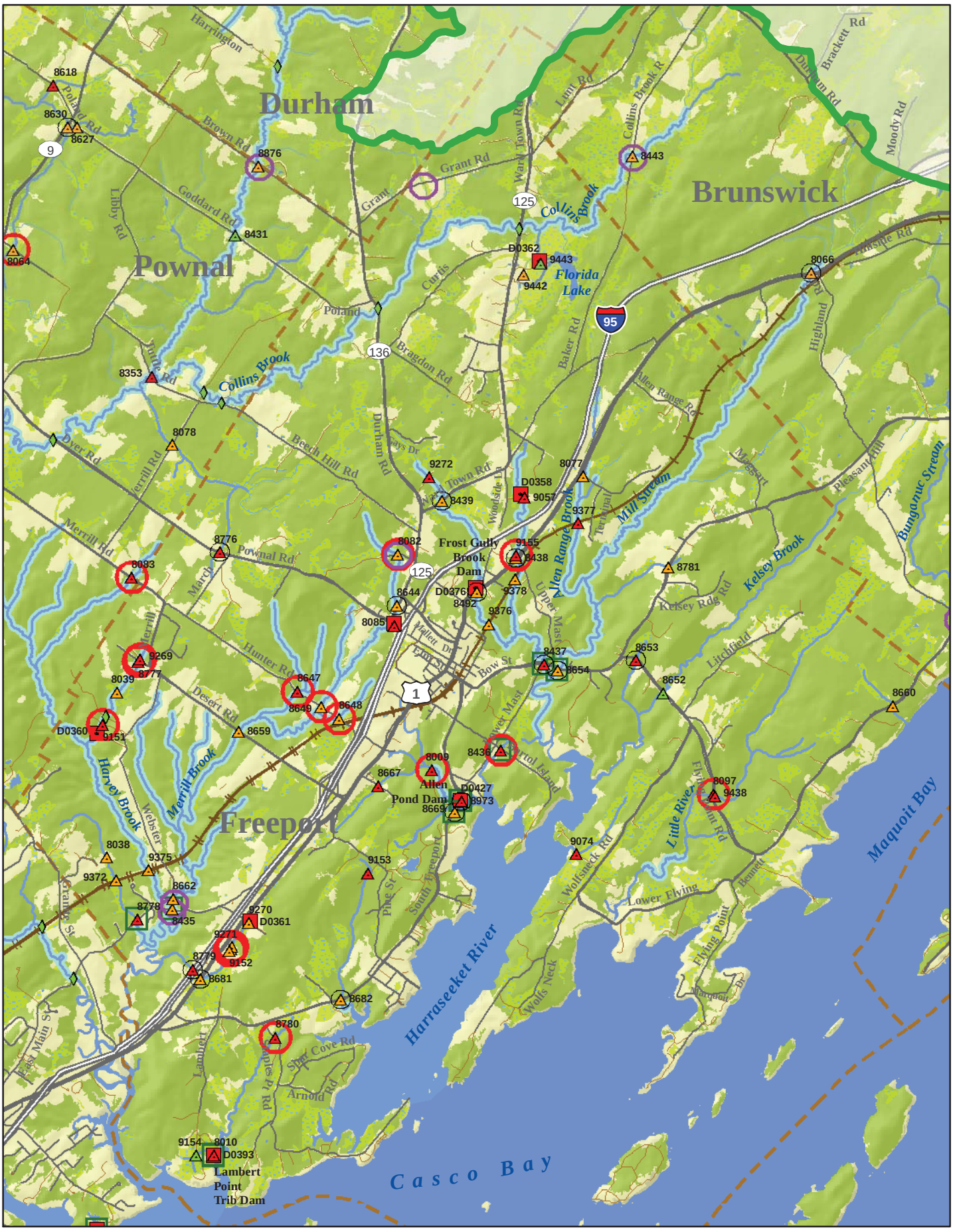
These maps are created primarily with 1:24,000 scale basemap data, with landcover data added to provide general distinctions between open and forested lands. Areas outside of the Casco Bay watershed are masked to obscure them.

Casco Bay Estuary Partnership

Scale Varies by Town
See scale bar at bottom of each map

Casco Bay Barriers by Town

Freeport



Severe and High Priority Potential Barriers by Town

Site ID	Town	Habitat Priority	Basic Structure Type	Barrier Class	Survey Date	Road Name	Road Type & Class	Stream	UTM East	UTM North	Stream Type	Number Of Culverts	Material	Condition
8436	Freeport	High	Culvert	Severe	9/2/2009	Artol Island Rd	Town / Paved	Unnamed	412084	4855601	Tidal	1	Metal	
9155	Freeport	High	Culvert	Severe	8/26/2009	Bennett Rd	Private / Paved	Unnamed	412284	4858095	Perennial	1	Metal	
9074	Freeport	High	Culvert	Severe	9/2/2009	Birch Point Rd	Private / Unpaved	Unnamed	413056	4854268	Perennial	1	Metal	
9153	Freeport		Culvert	Severe	9/3/2009	Bristol Rd	Private / Paved	Unnamed	410388	4854025	Perennial	1	Metal	
8435	Freeport	High	Culvert	Potential	9/3/2009	Country Rd	Town / Paved	Cousins River	407879	4853562	Tidal	1	Metal	
8778	Freeport	High	Culvert	Severe	9/1/2009	County Rd	Town / Paved	Unnamed	407434	4853431	Tidal	1	Metal	
8659	Freeport	High	Culvert	Potential	8/27/2009	Desert Rd	Town / Paved	Merrill Brook	408732	4855843	Perennial	1	Metal	
8777	Freeport	High	Culvert	Severe	8/27/2009	Desert Rd	Town / Paved	Unnamed	407449	4856734	Perennial	1	Plastic	
8039	Freeport	High	Culvert	Potential	8/27/2009	Dune Dr	Unknown / Paved	Unnamed	407173	4856338	Perennial	1	Plastic	
8644	Freeport	High	Culvert	Potential	8/26/2009	Durham Rd	State / Paved	Merrill Brook	410761	4857456	Perennial	1	Metal	
9151	Freeport	High	Culvert	Severe	8/27/2009	Eagler Nest Dr	Private / Driveway	Unnamed	406992	4855925	Perennial	1	Concrete	
8654	Freeport	High	Culvert	Potential	8/25/2009	Flying Point Rd	State / Paved	Allen Range Brook	412816	4856622	Tidal	1	Metal	
8437	Freeport	High	Culvert	Severe	8/25/2009	Flying Point Rd	State / Paved	Frost Gully Brook	412639	4856699	Tidal	1	Metal	
8097	Freeport	High	Culvert	Severe	9/2/2009	Flying Point Rd	Town / Paved	Little River	414812	4855038	Perennial	1	Metal	
8653	Freeport	High	Culvert	Severe	8/25/2009	Flying Point Rd	State / Paved	Unnamed	413814	4856752	Perennial	1	Metal	
9269	Freeport	High	Culvert	Severe	8/27/2009	Goldrup Lane	Private / Driveway	Unnamed	407471	4856767	Perennial	1	Plastic	
8439	Freeport	High	Multiple Culverts	Potential	8/26/2009	Griffin Rd	State / Paved	Frost Gully Brook	411330	4858792	Perennial	2	Metal	
8649	Freeport	High	Culvert	Potential	8/27/2009	Hunter Rd	Town / Paved	Merrill Brook	409792	4856161	Perennial	1	Plastic	
8647	Freeport	High	Culvert	Severe	8/27/2009	Hunter Rd	Town / Paved	Unnamed	409485	4856355	Perennial	1	Concrete	
8648	Freeport	High	Culvert	Potential	8/27/2009	Hunter Rd	Town / Paved	Unnamed	410018	4856008	Perennial	1	Plastic	
8779	Freeport	High	Culvert	Severe	9/14/2009	I-295	State / Paved	Unnamed	408143	4852793	Perennial	1	Concrete	
8492	Freeport	High	Culvert	Potential	8/26/2009	Main St.	State / Paved	Frost Gully Brook	411786	4857630	Perennial	1	Stone	
8438	Freeport	High	Culvert	Potential	8/26/2009	Main St/ Route 1	State / Paved	Unnamed	412287	4858060	Perennial	1	Metal	
8776	Freeport	High	Culvert	Severe	8/17/2009	Pownal Rd	State / Paved	Unnamed	408491	4858137	Perennial	1	Metal	
8077	Freeport	High	Culvert	Potential	8/25/2009	Prout Rd	Town / Paved	Allen Range Brook	413147	4859104	Perennial	1	Metal	
8082	Freeport	High	Multiple Culverts	Potential	8/26/2009	Richards Lane	Town / Paved	Merrill Brook	410772	4858108	Perennial	2	Plastic	
9272	Freeport	High	Multiple Culverts	Severe	8/26/2009	Scribner Dr Pvt	Private / Unpaved	Frost Gully Brook	411175	4859097	Perennial	2	Metal	
8973	Freeport	High	Multiple Culverts	Severe	9/2/2009	South Freeport Rd	State / Paved	Unnamed	411587	4854949	Tidal	2	Metal	
8682	Freeport	High	Culvert	Potential	9/2/2009	South Freeport Rd.	State / Paved	Unnamed	410037	4852410	Perennial	1	Metal	
8780	Freeport	High	Culvert	Severe	9/2/2009	Staples Point Rd	Town / Paved	Lambert Point Stream	409204	4851924	Perennial	1	Metal	
8085	Freeport	High	Culvert	Severe	8/27/2009	Unknown	Town / Paved	Merrill Brook	410727	4857193	Perennial	1	Concrete	
8667	Freeport	High	Culvert	Severe	9/3/2009	Varney Rd	Town / Paved	Unnamed	410513	4855145	Perennial	1	Metal	
8662	Freeport	High	Culvert	Potential	9/10/2009	Webster Rd	Town / Paved	Harvey Brook	407891	4853698	Perennial	1	Metal	
9377	Freeport	High	Culvert	Severe	8/25/2009		Railroad	Allen Range Brook	413081	4858506	Perennial	1	Metal	
D0362	Freeport	High	Dam	Severe	9/14/2009		NA	Florida Lake	412589	4861858	Perennial		Concrete	
9376	Freeport	High	Culvert	Potential	8/25/2009		Railroad	Frost Gully Brook	411933	4857217	Perennial	1	Stone	
D0358	Freeport	High	Dam	Severe	8/26/2009		NA	Frost Gully Brook	412351	4858871	Perennial		Concrete	
D0376	Freeport	High	Dam	Severe	8/26/2009		NA	Frost Gully brook	411771	4857666	Perennial		Concrete	
9375	Freeport	High	Culvert	Potential	10/8/2009		Railroad	Harvey Brook	407576	4854063	Perennial	1	Metal	
9438	Freeport	High	Culvert	Severe	9/2/2009		Private / Driveway	Little River	414829	4855010	Perennial	1	Metal	
D0359	Freeport	High	Dam	Severe	8/27/2009		NA	Merrill Brook	410729	4857208	Perennial		Concrete	
D0427	Freeport	High	Dam	Potential			NA	No Data	411575	4854947	Perennial		Stone	
8009	Freeport	High	Multiple Culverts	Severe	9/3/2009		Private / Trail	Unnamed	411207	4855349	Perennial	2	Concrete	
8010	Freeport		Culvert	Severe	10/8/2009		Private / Trail	Unnamed	408415	4850412	Tidal	1	Concrete	
9057	Freeport	High	Culvert	Severe	8/26/2009		Private / Driveway	Unnamed	412388	4858836	Perennial	1	Metal	
9378	Freeport	High	Culvert	Potential	8/25/2009		Railroad	Unnamed	412274	4857795	Perennial	1	Stone	
D0360	Freeport	High	Dam	Severe	8/27/2009		NA	unnamed	406923	4855806	Perennial		Earth	
D0361	Freeport	High	Dam	Severe	9/3/2009		NA	unnamed	408886	4853399	Perennial		Earth	
D0393	Freeport		Dam	Severe	10/8/2009		NA	Unnamed	408416	4850411	Tidal		Concrete	

Severe and High Priority Potential Barriers by Town

Site ID	Specific Structure Type	Inlet Condition	Inlet Blocked	Primary Inlet Span FT	Crossing Structure Length FT	Outlet Condition	Outlet Drop FT	Crossing Substrate	Fill Height FT	Estimated Stream Width FT	Upstream Miles to Next Barriers	Up-Stream Barriers	Total Upstream Miles	Down-stream Barriers	Dam Name	Hydraulic Height FT
8436	Round Culvert	At Grade	No	1.5	73.8	Perched	0.6	None		3.4	0.090	0	0.090	0		
9155	Round Culvert	At Grade	No		26.2	Perched	0.5	None		5.8	0.556	2	1.067	3		
9074	Round Culvert	At Grade	No	3.0	22.3	Perched	0.8	None		9.1	0.618	0	0.618	0		
9153	Round Culvert	At Grade	No	3.9	43.0	Perched/Cascade	1.0	None		8.7	0.178	0	0.178	1		
8435	Pipe Arch Culvert	At Grade	No	19.4	72.5	At Grade		None		2.2	5.886	16	19.901	0		
8778	Round Culvert	At Grade	No	3.7	61.0	Perched	1.6	None		3.5	1.209	0	1.209	0		
8659	Round Culvert	At Grade	No	12.3	99.1	At Grade		None		10.6	1.614	7	6.072	1		
8777	Round Culvert	At Grade	No	2.0	55.1	Perched/Cascade	1.4	None		8.5	0.025	1	0.092	6		
8039	Round Culvert	At Grade	No	3.4	66.3	At Grade		None		4.9	0.317	2	0.409	5		
8644	Pipe Arch Culvert	At Grade	No	4.9	100.7	At Grade		None		3.4	0.415	1	0.851	5		
9151	Round Culvert	At Grade	No	3.0	23.6	Perched	0.2	None		13.3	0.304	3	0.713	4		
8654	Pipe Arch Culvert	At Grade	No	12.3	93.5	At Grade		None		16.5	0.238	0	0.238	0		
8437	Pipe Arch Culvert	At Grade	No	11.1	77.8	Perched	0.7	None		11.2	1.439	10	4.413	0		
8097	Round Culvert	At Grade	No	3.9	55.1	Perched	0.0	None		4.2	0.011	1	3.102	0		
8653	Round Culvert	Inlet Drop	75%	2.6	69.9	Perched	2.3	None		6.9	0.168	0	0.168	0		
9269	Round Culvert	At Grade	No	1.7	50.9	Perched	1.6	None		7.7	0.068	0	0.068	7		
8439	Round Culvert	At Grade	No	3.9	47.2	At Grade		None		1.2	0.252	1	0.400	4		
8649	Round Culvert	At Grade	No	4.1	77.4	At Grade		None		3.5	1.598	4	2.618	2		
8647	Round Culvert	At Grade	No	2.8	79.1	Perched	1.0	None		4.5	1.441	0	1.441	2		
8648	Round Culvert	At Grade	No	2.0	44.9	At Grade		None		7.3	0.400	0	0.400	2		
8779	Round Culvert	At Grade	No	3.9	232.9	Perched	0.3	None		7.4	0.733	1	0.805	0		
8492	Box Culvert	Inlet Drop	No	7.4	84.3	At Grade		Comparable		7.2	0.022	3	1.374	2		
8438	Round Culvert	At Grade	No	2.7	88.9	At Grade		None		8.3	0.026	3	1.093	2		
8776	Round Culvert	At Grade	No	2.5	73.2	Perched	0.1	None		9.9	0.232	0	0.232	4		
8077	Round Culvert	At Grade	No	3.2	74.5	At Grade		None		7.7	0.697	0	0.697	1		
8082	Round Culvert	At Grade	No	2.3	39.0	At Grade		None		14.1	0.437	0	0.437	6		
9272	Round Culvert	At Grade	50%	3.4	40.7	Perched	0.5	None		14.3	0.148	0	0.148	5		
8973	Round Culvert	At Grade	No	5.8	60.0	Perched	0.7	None		4.9	0.008	3	2.426	0		
8682	Round Culvert	At Grade	No	5.9	92.8	At Grade		None		16.7	1.063	1	1.241	0		
8780	Round Culvert	At Grade	100%	2.0	71.5	At Grade		None		10.1	0.216	0	0.216	0		
8085	Round Culvert	Inlet Drop	No	3.9	53.8	Perched	1.0	None		6.4	0.009	3	1.020	3		
8667	Round Culvert	At Grade	No	4.7	63.0	Perched/Cascade	0.3	None		4.4	0.498	0	0.498	3		
8662	Round Culvert	At Grade	No	10.3	54.8	At Grade		Comparable		31.1	0.478	7	7.943	1		
9377	Round Culvert	At Grade	No	5.6	137.1	Perched	0.3	Comparable		5.1	0.623	1	1.320	0		
D0362										8.0	0.050	0	0.050	5	Unnamed	3.3
9376	Box Culvert	At Grade	No	4.9	152.6	At Grade		None		8.9	0.322	4	1.696	1		
D0358										9.8	0.466	0	0.466	5	Frost Gully Bk Trib Dam	0.2
D0376										6.9	0.953	2	1.353	3	Frost Gully Brook Dam	2.4
9375	Round Culvert	At Grade	No	7.9	177.2	At Grade		None		11.0	6.296	6	7.465	2		
9438	Round Culvert	At Grade	25%	4.3	20.0	Perched	1.2	Contrasting		9.8	3.091	0	3.091	1		
D0359										5.5	0.159	2	1.011	4	Unnamed	0.7
D0427										8.1	0.459	2	2.419	1	Allen Pond Dam	6.0
8009	Round Culvert	At Grade	No	4.0	54.3	Perched	1.1	None		13.0	1.462	1	1.960	2		
8010	Box Culvert	Inlet Drop	75%		26.2	At Grade		Unknown		5.2	0.385	0	0.385	1		
9057	Round Culvert	Inlet Drop	No	3.0	20.0	Perched	0.3	None		6.9	0.045	1	0.511	4		
9378	Box Culvert	At Grade	No	2.7	132.2	At Grade		Comparable		9.5	0.185	4	1.279	1		
D0360										10.5	0.087	4	0.800	3	Unnamed	2.6
D0361										10.1	0.072	0	0.072	1	Unnamed	4.3
D0393										5.0	0.001	1	0.386	0	Lambert Point Trib Dam	4.9