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Casco Bay Watershed Fish Barrier Priorities Atlas: Bridgton

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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 surveys¹ 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.

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.

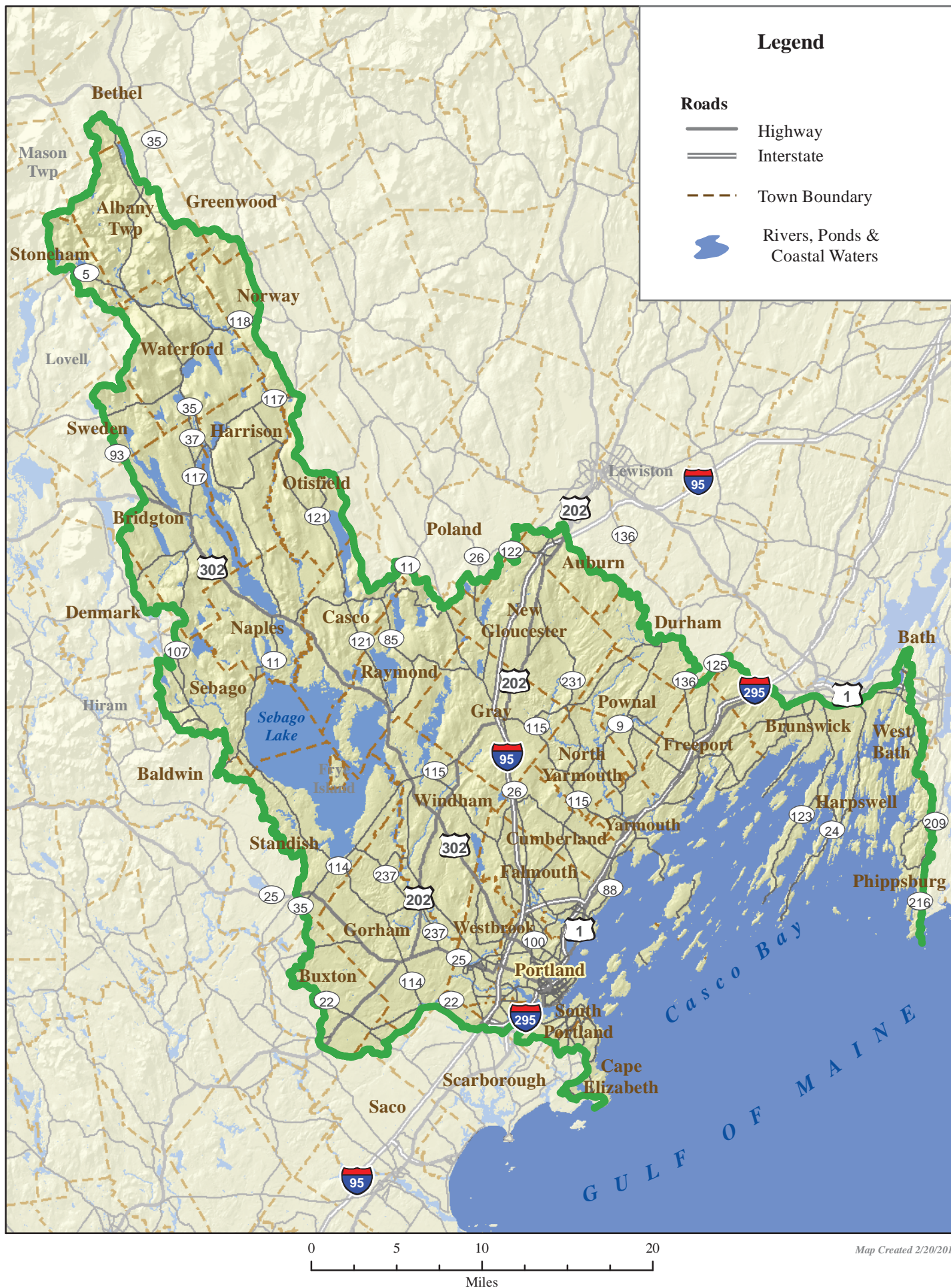
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Casco Bay Barriers by Town

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

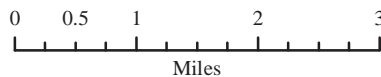
- Private
- Public
- Highway
- Interstate

- 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.

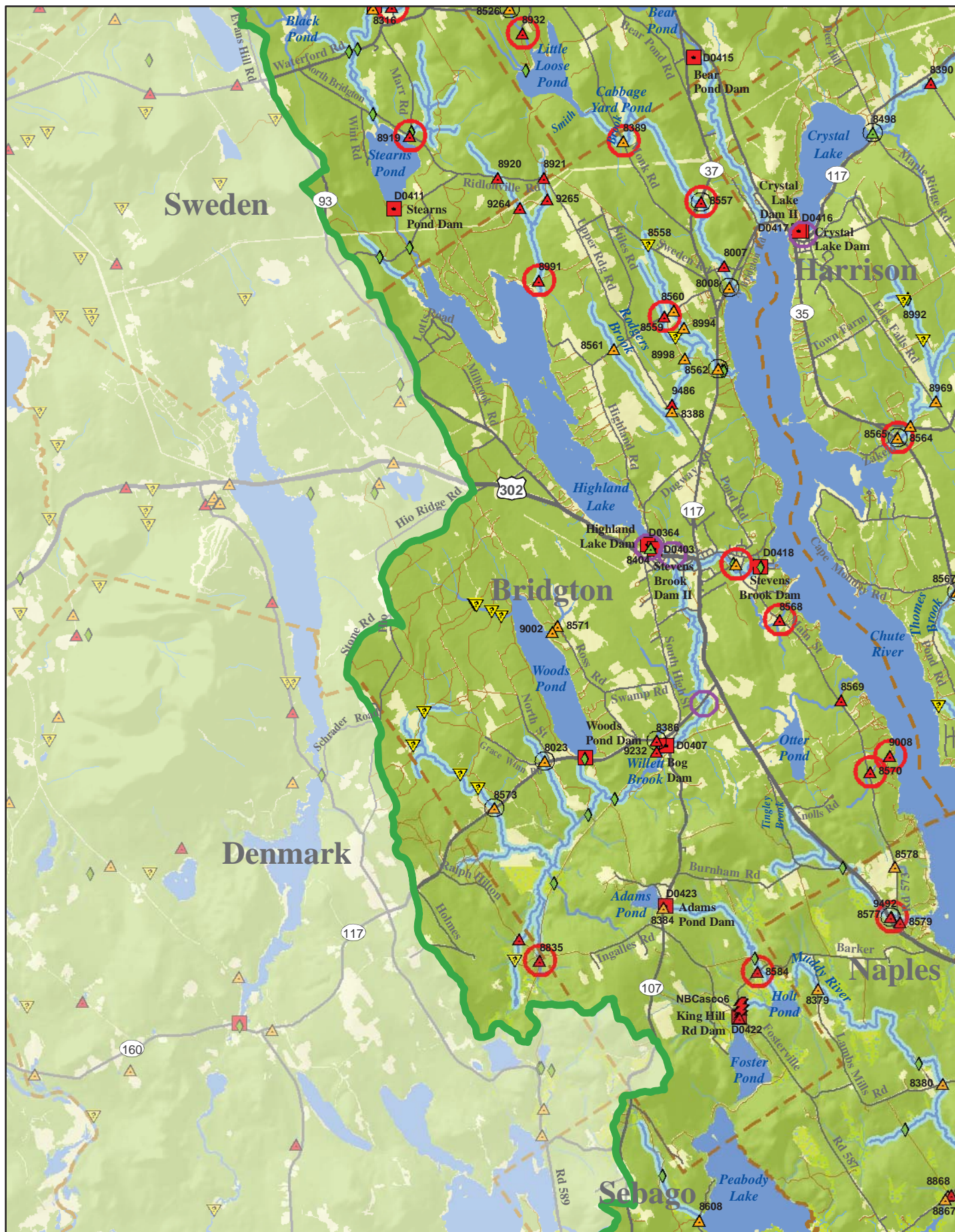


Scale Varies by Town
See scale bar at bottom of each map



Casco Bay Barriers by Town

Bridgton



0 0.5 1 2 3 4
Miles

Map Created 2/20/2012

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
8991	Bridgton	High	Culvert	Severe	7/28/2010	Big Sandy Rd	Private / Unpaved	Unnamed	360630	4884674	Perennial	1	Metal	
8007	Bridgton	High	Culvert	Severe	7/16/2010	Brown Mill Rd	Town / Paved	Smith Brook	364197	4884944	Perennial	1	Concrete	
8559	Bridgton	High	Multiple Culverts	Severe	7/16/2010	Chadborn Hill	Town / Paved	Rodgers Brook	363046	4883980	Perennial	2	Concrete	Rust
8561	Bridgton	High	Culvert	Potential	7/16/2010	Chadborn Hill Rd	Town / Paved	Rodgers Brook	362070	4883345	Perennial	1	Metal	
8560	Bridgton	High	Culvert	Potential	7/16/2010	Chadborn Hill Rd	Town / Paved	Unnamed	363221	4884087	Perennial	1	Metal	Rust
8590	Bridgton	High	Multiple Culverts	Severe	9/28/2010	Fosterville Rd	Town / Paved	Gristmill Brook	364489	4870458	Perennial	4	Concrete	
9264	Bridgton	High	Culvert	Severe	7/28/2010	Highland Point Rd	Private / Paved	Unnamed	360269	4886068	Perennial	1	Metal	
9265	Bridgton	High	Culvert	Severe	7/28/2010	Highland Point Rd	Private / Paved	Unnamed	360795	4886223	Perennial	1	Metal	
8569	Bridgton		Culvert	Severe	8/12/2010	Kansas Rd	Private / Paved	Sucker Brook	366450	4876571	Perennial	1	Concrete	
8570	Bridgton		Culvert	Severe	8/12/2010	Kansas Rd	Private / Paved	Unnamed	367010	4875194	Perennial	1	Metal	Rust
9487	Bridgton	High	Culvert	Potential	7/19/2010	Kansas Rd	Town / Paved	Unnamed	364437	4879191	Perennial	1	Plastic	
8568	Bridgton		Culvert	Severe	7/19/2010	Kansas Rd.	Town / Paved	No Data	365268	4878116	Perennial	1	Plastic	
9008	Bridgton		Culvert	Severe	8/12/2010	Kansas Shores Rd	Private / Unpaved	Unnamed	367387	4875509	Perennial	1	Metal	Rust
8584	Bridgton	High	Multiple Culverts	Severe	9/28/2010	King Hill Rd	Town / Unpaved	Sawyer Brook	364833	4871337	Perennial	2	Metal	
8388	Bridgton	High	Culvert	Potential	7/16/2010	Middle Ridge Rd	Town / Paved	Rodgers Brook	363203	4882128	Perennial	1	Concrete	
8389	Bridgton	High	Multiple Culverts	Potential	8/3/2010	Monk Rd	Town / Unpaved	Smith Brook	362262	4887344	Perennial	3	Metal	
8557	Bridgton	High	Multiple Culverts	Severe	8/3/2010	North Bridgton Rd	State / Paved	Smith Brook	363752	4886187	Perennial	2	Metal	
8023	Bridgton	High	Culvert	Potential	7/19/2010	Rt. 117	State / Paved	Jack Branch	360749	4875402	Perennial	1	Metal	
8562	Bridgton	High	Multiple Culverts	Potential	7/16/2010	Rt. 117	State / Paved	Rodgers Brook	364078	4882973	Perennial	2	Concrete	
8386	Bridgton	High	Multiple Culverts	Severe	7/19/2010	Rt. 117	State / Paved	Unnamed	362896	4875803	Perennial	2	Metal	Rust
8573	Bridgton	High	Culvert	Potential	10/5/2010	Rte 117	State / Paved	Day Brook	359768	4874495	Perennial	1	Concrete	
8994	Bridgton	High	Culvert	Potential	7/16/2010	Sunnybrook Farm Rd	Private / Paved	Unnamed	363421	4883764	Perennial	1	Metal	
8998	Bridgton	High	Culvert	Potential	7/16/2010	Sunnybrook Farms Rd	Private / Paved	Rodgers Brook	363435	4883166	Perennial	1	Metal	
8384	Bridgton	High	Culvert	Potential	9/28/2010	Unknown	Town / Unpaved	Sawyer Brook	363024	4872572	Perennial	1	Metal	
NBCasco8	Bridgton	High	Debris Jam	Potential	10/5/2010		NA	Day Brk	359757	4874510	Perennial			
9005	Bridgton	High	Unknown	Potential	10/18/2010		Private	Day Brook	358418	4876323	Perennial			
9014	Bridgton	High	Unknown	Potential	10/18/2010		Private	Day Brook	359464	4874863	Perennial			
9231	Bridgton	High	Unknown	Potential	10/18/2010		Private	Day Brook	359110	4875128	Perennial			
NBCasco6	Bridgton	High	Natural Falls	Severe	9/28/2010		NA	Gristmill Brk	364520	4870613	Perennial			
D0422	Bridgton	High	Dam	Severe	9/28/2010		NA	Gristmill Brook	364489	4870458	Perennial		Concrete	
8558	Bridgton	High	Culvert	Potential	8/3/2010		Town	No Data	362737	4885320	Perennial	1		
8996	Bridgton	High	Unknown	Potential	8/3/2010		Private	No Data	363258	4883545	Perennial			
9007	Bridgton	High	Unknown	Potential	10/18/2010		Private	No Data	358210	4875691	Perennial			
D0423	Bridgton	High	Dam	Severe	9/28/2010		NA	Sawyer Brook	363086	4872587	Perennial		Stone	
D0364	Bridgton	High	Dam	Severe	7/19/2010		NA	Stevens Brook	362743	4879548	Perennial			
D0403	Bridgton	High	Dam	Severe	7/19/2010		NA	Stevens Brook	362862	4879471	Perennial			
D0404	Bridgton	High	Dam	Severe	7/19/2010		NA	Stevens Brook	361540	4875460	Perennial			
D0407	Bridgton	High	Dam	Severe	7/19/2010		NA	Stevens Brook	363104	4875689	Perennial			
D0418	Bridgton	High	Dam	Severe	7/19/2010		NA	Stevens Brook	364905	4879131	Perennial			
9232	Bridgton	High	Culvert	Severe	7/19/2010		Private / Unpaved	Willett Brook	362901	4875590	Perennial	1	Metal	

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
8991	Pipe Arch Culvert	At Grade	No	4.8	39.4	Perched	0.5	None	2.6		1.619	4	3.100	5		
8007	Round Culvert	At Grade	No	5.9	32.8	Perched	1.2	None	3.3		1.091	3	7.480	1		
8559	Round Culvert	At Grade	No	2.0	36.1	Perched/Cascade	2.5	None	3.6		0.716	0	0.716	3		
8561	Round Culvert	At Grade	No	3.0	36.4	At Grade		None	3.3		0.624	0	0.624	4		
8560	Round Culvert	At Grade	No	3.9	40.0	At Grade		Contrasting	4.6		0.925	1	1.082	3		
8590	Round Culvert	At Grade	No	3.1	32.2	Cascade		None		1.3	0.102	0	0.102	4		
9264	Round Culvert	At Grade	No	4.9	53.8	Perched	0.3	None	3.3		0.450	1	1.000	6		
9265	Round Culvert	At Grade	No	5.7	64.0	Perched	1.3	None	2.0		0.291	1	0.481	6		
8569	Box Culvert	At Grade	No	8.0	36.7	Perched	0.4	Comparable	2.2		3.033	0	3.033	1		
8570	Round Culvert	At Grade	No	2.2	49.9	Perched/Cascade	2.0	None	2.7		0.596	0	0.596	2		
9487	Round Culvert	At Grade	No	3.1	44.9	At Grade		Comparable	8.2	3.1	4.462	29	48.186	2		
8568	Round Culvert	Inlet Drop	No	2.0	79.1	Perched	1.4	None	7.4	36.4	1.077	0	1.077	1		
9008	Round Culvert	At Grade	No	2.6	26.5	Perched/Cascade	1.0	None	3.1		0.334	1	0.930	1		
8584	Round Culvert	At Grade	50%	2.2	36.1	Cascade		Contrasting		9.6	1.796	2	1.959	3		
8388	Round Culvert	At Grade	No	4.4	40.4	At Grade		None	2.6		1.481	1	2.104	3		
8389	Round Culvert	At Grade	No	3.0	30.2	At Grade		None	1.3	3.9	3.537	1	4.158	3		
8557	Round Culvert	At Grade	25%	3.3	28.2	Perched	0.6	None	6.6	2.6	2.231	2	6.389	2		
8023	Round Culvert	At Grade	No	3.1	46.9	At Grade		None	0.7		0.370	0	0.370	4		
8562	Box Culvert	At Grade	No	10.2	175.5	At Grade		None	11.5	6.0	1.328	8	6.575	1		
8386	Round Culvert	At Grade	75%	3.1	59.7	Perched	0.3	Unknown	4.3		0.242	0	0.242	5		
8573	Box Culvert	At Grade	No	9.0	37.7	At Grade		Comparable		3.8	0.010	5	2.891	4		
8994	Round Culvert	At Grade	No	5.6	40.4	At Grade	0.0	None	13.1	3.7	0.244	2	1.326	2		
8998	Round Culvert	At Grade	No	6.9	50.2	At Grade		Comparable	2.3		0.725	2	2.830	2		
8384	Round Culvert	At Grade	No	2.5	24.6	At Grade		Unknown		8.4	0.119	0	0.119	5		
NBCasco8										6.7	0.295	4	2.881	5		
9005			No							4.9	0.315	0	0.315	8		
9014			No							5.4	0.374	3	2.586	6		
9231			No							2.8	1.558	2	2.212	7		
NBCasco6										2.7	0.106	2	0.207	3		
D0422										3.6	0.102	0	0.102	4	King Hill Rd Dam	2.8
8558			No	< 1.5						4.8	0.157	0	0.157	4		
8996			No							4.5	0.375	1	1.091	2		
9007			No							7.9	0.338	0	0.338	8		
D0423										9.3	0.044	1	0.163	4	Adams Pond Dam	7.1
D0364										3.9	8.067	13	24.839	4	Highland Lake Dam	8.0
D0403										4.4	0.099	14	24.939	3	Stevens Brook Dam II	4.9
D0404										3.8	4.130	0	4.130	4	Woods Pond Dam	4.9
D0407										4.3	9.919	13	18.786	3	Bog Dam	9.2
D0418										14.0	0.591	30	48.778	1	Stevens Brook Dam	10.7
9232	Round Culvert	At Grade	100%	3.6	21.7	At Grade		Unknown	3.3		0.154	1	0.395	4		