

2012

## Casco Bay Watershed Fish Barrier Priorities Atlas: Buxton

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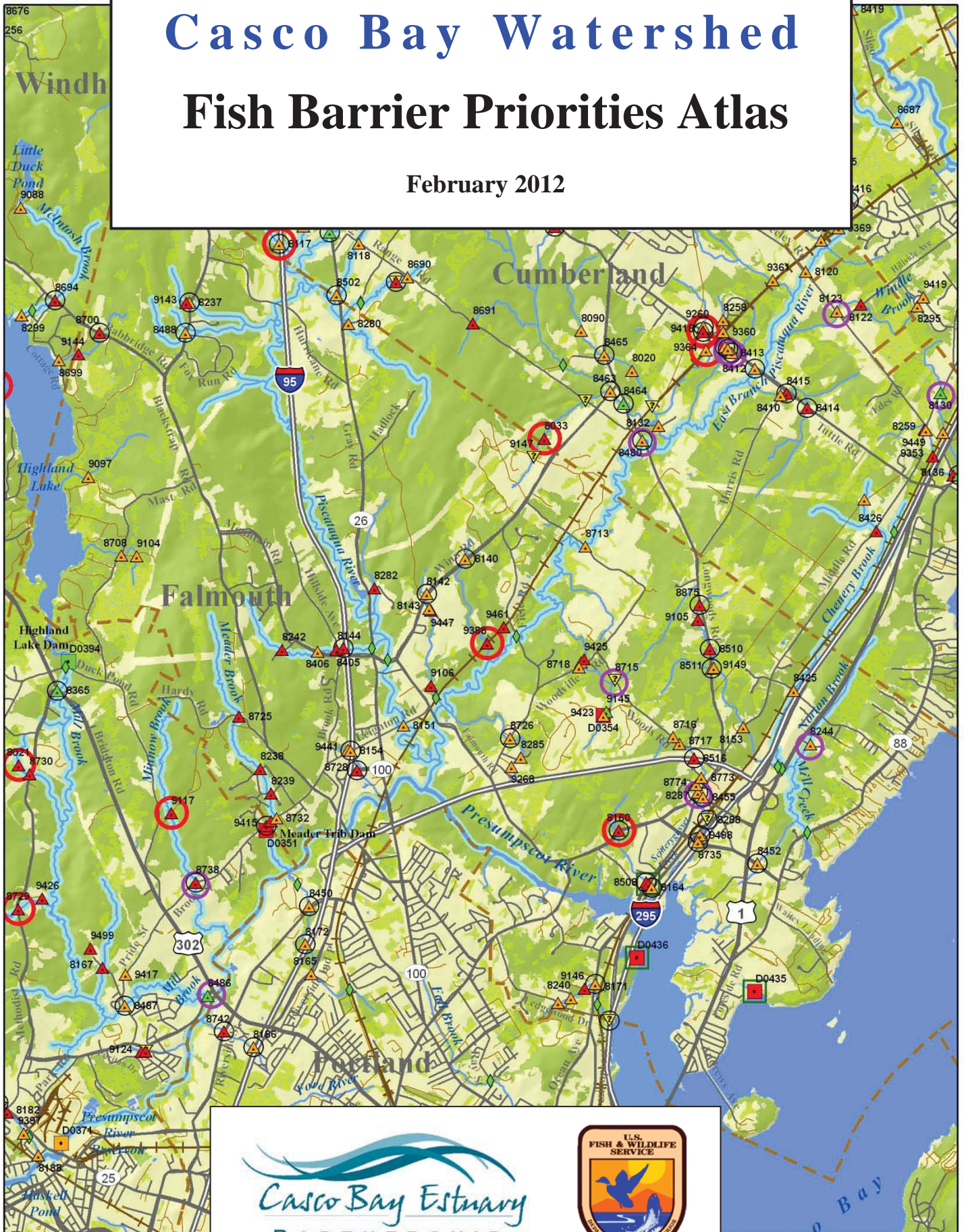
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# Casco Bay Watershed Fish Barrier Priorities Atlas

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<sup>1</sup> 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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<sup>1</sup> 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](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.

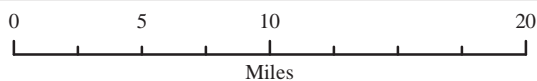
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# Casco Bay Barriers by Town

# 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

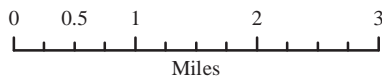
## Roads

- 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.

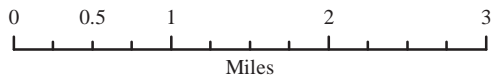
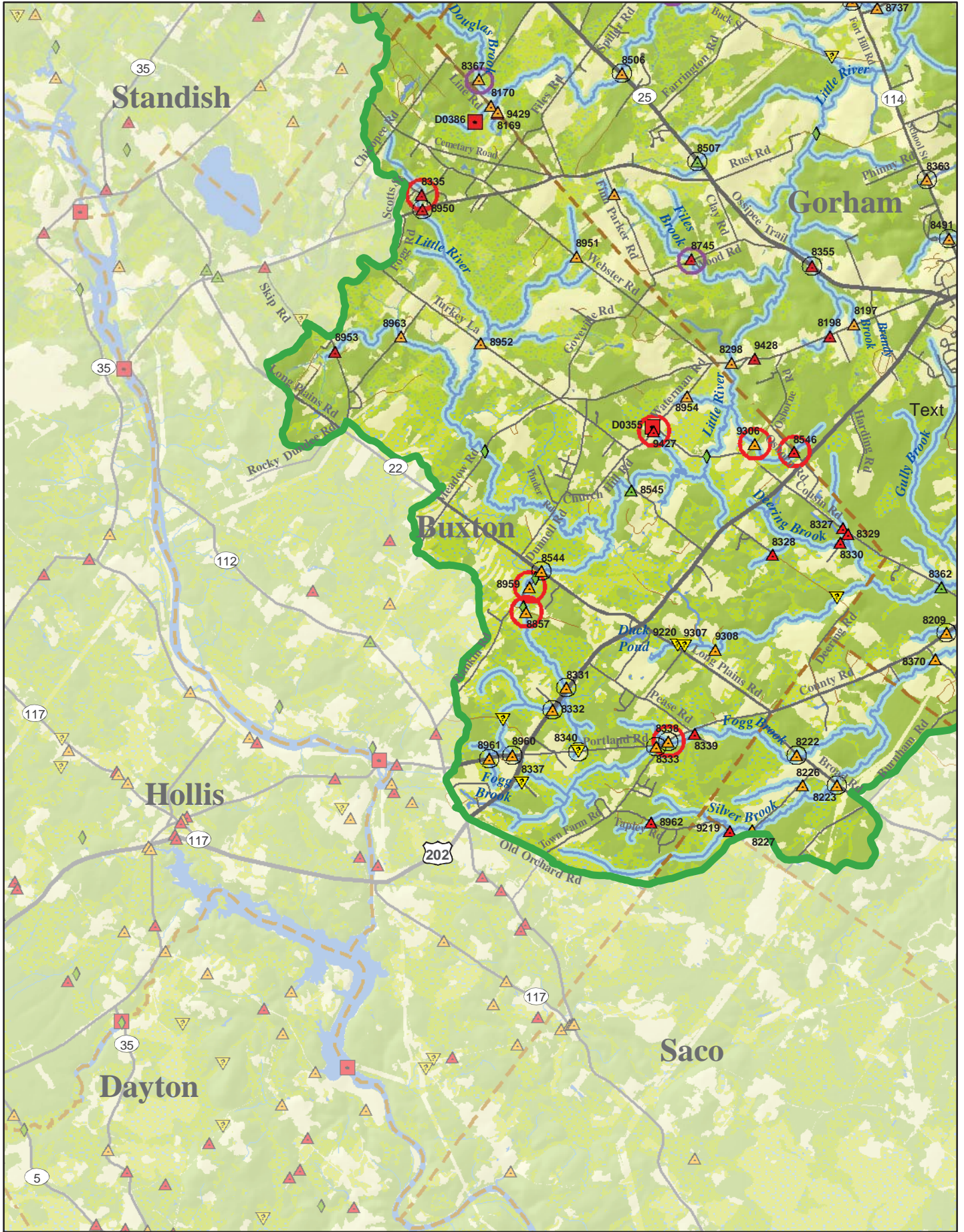


Scale Varies by Town  
See scale bar at bottom of each map



# Casco Bay Barriers by Town

# Buxton



## 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
8328	Buxton	High	Multiple Culverts	Severe	8/6/2010	Atkinson Rd	Town / Paved	Unknown	380679	4833227	Perennial	2	Plastic	
9306	Buxton	High	Culvert	Potential	7/23/2009	Bowder Rd	Private / Unpaved	Unnamed	380407	4834916	Perennial	1	Metal	
8327	Buxton	High	Culvert	Severe	8/5/2010	Cousins Rd	Town / Paved	Unknown	381757	4833640	Perennial	1	Metal	
8963	Buxton	High	Multiple Culverts	Potential	8/3/2009	Henry Hill Rd	Town / Paved	Unnamed	375003	4836574	Perennial	2	Plastic	
8335	Buxton	High	Culvert	Severe	7/27/2009	Kevin Circle	Town / Paved	Unknown	375320	4838737	Perennial	1	Concrete	
8169	Buxton	High	Culvert	Severe	7/27/2009	Line Rd	Town / Paved	Unknown	376477	4839984	Perennial	1	Metal	
8544	Buxton	High	Multiple Culverts	Potential	6/26/2009	Long Plains Rd	State / Paved	Unnamed	377153	4832984	Perennial	2	Metal	
8546	Buxton	High	Culvert	Severe	6/16/2009	Osborn Rd	Town / Paved	Unknown	381005	4834796	Perennial	1	Metal	
8329	Buxton	High	Culvert	Severe	8/5/2010	Patten Farm Rd	Town / Unpaved	Deering Brook	381834	4833539	Perennial	1	Metal	
8330	Buxton	High	Culvert	Severe	8/5/2010	Patten Farm Rd	Town / Unpaved	Deering Brook	381719	4833412	Perennial	1	Concrete	
8339	Buxton	High	Multiple Culverts	Severe	8/6/2010	Pease Rd Ext	Town / Paved	Fogg Brook	379492	4830498	Perennial	3	Concrete	
8333	Buxton	High	Culvert	Potential	8/6/2010	Portland Rd	State / Paved	Fogg Brook	378902	4830297	Perennial	1	Metal	
8338	Buxton	High	Culvert	Potential	8/6/2010	Portland Rd	State / Paved	Fogg Brook	379080	4830380	Perennial	1	Metal	
8960	Buxton	High	Culvert	Potential	6/26/2009	Portland Rd	State / Paved	Unnamed	376708	4830172	Perennial	1	Metal	
8961	Buxton	High	Culvert	Potential	6/26/2009	Portland Rd	State / Paved	Unnamed	376355	4830118	Perennial	1	Metal	
8959	Buxton	High	Culvert	Potential	6/26/2009	Rankin Rd	Town / Paved	Little River	376968	4832734	Perennial	1	Plastic	
8331	Buxton	High	Culvert	Potential	6/26/2009	Route 4	State / Paved	Unnamed	377535	4831198	Perennial	1	Concrete	
8332	Buxton	High	Culvert	Potential	6/26/2009	Route 4/202	State / Paved	Unnamed	377318	4830862	Perennial	1	Concrete	
8953	Buxton	High	Culvert	Severe	8/3/2009	Skip Rd	Town / Paved	Unnamed	373996	4836349	Perennial	1	Metal	
8962	Buxton	High	Culvert	Severe	8/10/2010	Tapley Rd	Town / Paved	Silver Brook	378819	4829139	Perennial	1	Concrete	
9308	Buxton	High	Multiple Culverts	Potential	8/6/2010	Tracy Rd	Private / Unpaved	Stroudwater River	379803	4831785	Perennial	4	Metal	
8952	Buxton	High	Multiple Culverts	Potential	8/3/2009	Turkey Lane	Town / Paved	Little River	376222	4836478	Perennial	2	Metal	
8950	Buxton	High	Culvert	Severe	5/25/2010	Turkey Lane	State / Paved	Unnamed	375331	4838520	Perennial	1	Metal	Rust
8857	Buxton	High	Multiple Culverts	Potential	7/23/2009	Unknown	Private / Unpaved	Unnamed	376920	4832354	Perennial	2	Concrete	
9427	Buxton	High	Culvert	Severe	7/23/2009	Waterman Dr	Town / Paved	Unnamed	378858	4835115	Perennial	1	Metal	
8954	Buxton	High	Culvert	Potential	7/23/2009	Waterman Rd	Town / Paved	Unnamed	379377	4835664	Perennial	1	Metal	
8951	Buxton	High	Culvert	Potential	7/23/2009	Webster Rd	Town / Paved	Unnamed	377680	4837798	Perennial	1	Metal	
8337	Buxton	High	Culvert	Potential	8/5/2010		Town	No Data	376843	4829739	Perennial			
8340	Buxton	High	Culvert	Potential	6/26/2009		State	No Data	377711	4830223	Perennial			
8858	Buxton	High	Unknown	Potential	6/26/2009		Private	No Data	376559	4830702	Perennial			
9218	Buxton	High	Unknown	Potential	8/6/2010		Private	Stroudwater River	381664	4832564	Perennial			
9220	Buxton	High	Culvert	Potential	8/6/2010		Private	Stroudwater River	379223	4831842	Perennial			
9307	Buxton	High	Culvert	Potential	8/6/2010		Private	Stroudwater River	379331	4831827	Perennial			
D0355	Buxton	High	Dam	Severe			NA	unnamed	378850	4835163	Perennial			
D0386	Buxton	High	Dam	Severe			NA	unnamed	376139	4839839	Perennial			



## 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
8328	Round Culvert	At Grade	No	2.0	35.8	Perched	0.1	None		9.8	0.229	0	0.229	1		
9306	Round Culvert	At Grade	No	3.0	36.4	At Grade		None		56.1	0.509	1	0.879	3		
8327	Round Culvert	At Grade	No	3.5	45.9	Perched	0.8	None		10.6	0.731	0	0.731	1		
8963	Round Culvert	At Grade	No	5.0	72.8	At Grade		None		16.8	1.056	1	1.174	3		
8335	Round Culvert	At Grade	No	2.5	47.2	Perched/Cascade	1.2	None		8.1	0.273	0	0.273	5		
8169	Round Culvert	At Grade	No	3.1	34.4	Cascade		None		3.6	0.194	0	0.194	7		
8544	Round Culvert	At Grade	No	4.1	65.5	At Grade		None		14.7	0.310	8	5.390	3		
8546	Round Culvert	At Grade	No	3.0	41.7	Perched	0.1	None		4.6	0.370	0	0.370	4		
8329	Round Culvert	At Grade	No	6.0	35.1	Perched	1.3	Comparable		4.2	0.480	1	1.211	0		
8330	Round Culvert	At Grade	No	6.0	26.2	Perched	0.3	Comparable		3.0	1.740	1	1.969	0		
8339	Round Culvert	At Grade	No	2.5	29.5	Perched	0.4	None		11.5	0.287	3	5.122	4		
8333	Round Culvert	At Grade	No	3.9	54.5	At Grade		None		4.4	4.080	1	4.156	6		
8338	Round Culvert	At Grade	No	1.5	59.7	At Grade		Comparable		2.4	0.679	2	4.835	5		
8960	Round Culvert	At Grade	No	2.1	50.5	At Grade		None		2.6	0.103	0	0.103	9		
8961	Round Culvert	At Grade	No	2.4	50.5	At Grade		None		37.3	0.306	0	0.306	9		
8959	Round Culvert	At Grade	No	3.1	39.1	At Grade		None		12.0	0.327	7	5.080	4		
8331	Round Culvert	At Grade	No	5.9	98.6	At Grade		None		14.4	1.044	5	3.696	6		
8332	Round Culvert	At Grade	No	5.4	72.8	At Grade		Contrasting		3.6	1.337	3	2.579	7		
8953	Round Culvert	Inlet Drop	No	4.1	36.7	Perched	1.8	None		18.8	0.118	0	0.118	4		
8962	Round Culvert	At Grade	No	2.6	42.7	Perched/Cascade	1.1	None		9.4	0.509	0	0.509	5		
9308	Round Culvert	At Grade	25%	3.5	26.9	At Grade		Comparable		11.8	1.158	2	1.536	1		
8952	Pipe Arch Culvert	At Grade	No	5.7	46.3	At Grade		None		4.0	4.652	3	5.552	3		
8950	Round Culvert	At Grade	25%	3.1	50.9	Perched	1.6	None		5.8	0.162	1	0.436	4		
8857	Round Culvert	At Grade	No	2.7	16.4	At Grade		None		2.3	1.057	6	4.753	5		
9427	Round Culvert	At Grade	No	2.5	70.9	Perched	0.3	None		6.8	0.036	1	0.071	3		
8954	Round Culvert	At Grade	No	2.7	51.5	At Grade		Comparable		4.6	0.162	0	0.162	3		
8951	Round Culvert	At Grade	No	1.6	34.4	At Grade		None		7.2	0.465	0	0.465	4		
8337			No	< 1.5						2.7	0.076	0	0.076	7		
8340			No	< 1.5						3.0	0.072	0	0.072	7		
8858			No							2.6	0.834	2	1.243	8		
9218			No							6.4	1.710	3	3.246	0		
9220			No	< 1.5						3.4	0.310	0	0.310	3		
9307			No	< 1.5						0.9	0.068	1	0.378	2		
D0355										6.6	0.035	0	0.035	4	Little River Trib Dam	5.0
D0386										16.6	0.384	0	0.384	7	Pine Ridge Dam	5.0