

## **SECTION 5: OVERVIEW OF RETURN THE TIDES METHODOLOGY**

This section presents an overview of the tidal crossing inventory methodology of the *Return the Tides* program. In our view, an integrated methodology for the identification and assessment of tidal wetland problems is crucial for several reasons. First, at the largest scale, we believe that it is important to develop a comprehensive inventory of tidal restrictions for the entire Maine coastline so that the scope of the problem can be assessed statewide in a rational manner. Since the resources do not exist to commission such an inventory by the state or federal governments, this assessment will have to be done on an incremental basis using local resource groups and interested activists. A standard approach by all groups will allow the results to be aggregated more easily as the projects are completed.

Second, at a more local scale, it is important to implement a systematic approach to identifying and evaluating tidal restrictions. The data forms (Appendices xx,y,z,) that have been developed in this methodology can be utilized by anyone to inventory sites and record observations. The data from these forms can be integrated with GIS information using forms developed by the Island Institute and can be integrated into the regional inventory for the Gulf of Maine developed by GPAC<sup>2</sup>. This database forms the foundation of a targeted action plan for restoration projects; further evaluations by marsh specialists, and for post project monitoring. These sites can also be visually displayed as a layer on a GIS map if one has been developed for the area.

The following methodology is based on several earlier efforts<sup>3</sup>. We think that it will be sufficient for identifying the universe of possible tidal crossings as well as serving as a preliminary screening of that universe for further actions. Actions might range from eliminating the site from the study, since it does not meet the definition of a restrictive tidal marsh crossing, to volunteer monitoring of a site, since it does not currently appear to be causing damage to the marsh, to further evaluation of a possible problem site for

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<sup>1</sup> This section is largely adapted from Tidal Crossing Handbook, A Volunteer Guide to Assessing Tidal Restrictions, Timothy A. Purinton and David C. Mountain, Ph.D., Parker River Clean Water Association, 69p.1998(?)

<sup>2</sup> See Dionne & Neckles, xx 2000

restoration.

## **Details of the Methodology**

### Preliminary Phase

The first and possibly most important step is to create a list of all potential tidal crossings in the study area. Initial identification can be done using a GIS analysis, comparing Wetland database information with transportation information (roads, railroads etc.) to highlight potential tidal marsh crossings or by a simple examination of USGS topographical maps. In both cases the focus of the study on all water features located between the shoreline and the first contour line above the shoreline. Wherever a road or railroad crosses such a watercourse, there may be a tidal crossing. Often, in our field investigations, we found marshes located above these crossings even though the map did not show marsh symbols. If a dam or a pond is indicated on these watercourse, that site should also be noted since dams and their upstream ponds may be former marshes that have restoration potential. A list of potential crossing is developed from this study using the Preliminary Listing Form (Appendix H) Separate lists are prepared for each Topographic quadrangle and each crossing is assigned an ID number.

Depending on the skill levels of the group doing the assessment, the study of other sources such as wetlands inventory maps, nautical charts, air photos, and Coastal Marine Geological Environment maps, are helpful in identifying additional potential crossings. One of the greatest resources for this phase is people. Interviews with people with local knowledge, such as members of local land trusts, conservation commissions, water quality monitors, fishermen, and residents in the study area can supplement the map study.

[[Insert Figure 13-Preliminary Listing form]]

### Phase I

It is essential to get out in the field early to confirm that the sites on the preliminary listing are actually tidal crossings and to search for crossings that are not mapped, either

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<sup>3</sup> Bryan and Dionne, 1997 and Mountain & Purinton, 1998

because they are new or too small. Also fieldwork is fun and energizing. This is where a dedicated team of trained volunteers is helpful. Each site identified in the Preliminary Listing or in the field should be visited. If the site is clearly above tide level or there is no crossing structure at the site or there is no associated marsh or potential marsh upstream, an appropriate notation is made on the preliminary listing and nothing further is done (of course if obvious problems are identified, they should be noted for another study. More information is gathered on all remaining sites.

Phase I, consists of a preliminary, visual assessment to determine which crossings are apparently restrictive. If the size and type of crossing and the resource areas upstream and downstream from the crossing show no signs of any restriction, photos and summary, estimated data is gathered using the Phase I data sheet. If a crossing appears restrictive, measured data is gathered and a sketch is made. The goal of Phase I is to visit and inventory all crossings and to gather sufficient data to identify those that need more detailed quantitative study in Phase II

[[Insert Figure 14- Sample Data Sheet (Phase I)]]

## Phase II

Phase II is the first “technical” screening process and involves an intensive, daylong tidal monitoring effort. The goal of Phase II is to provide quantitative data showing the impact of the crossing on the on the tidal curve on each side of the crossing. Volunteers measure the tides every two hours, at each of several crossings, over a complete tidal cycle (approximately 12 hours). In our Casco Bay pilot study, we marketed this volunteer-driven effort as the "Return the Tides Day," which seemed to capture local interest. We think that this is a good exercise to publicize in its own right in that local people are out working on resource issues in their communities. The event also provides a vehicle to talk with local press and municipal officials about the problems of restrictive crossings and the objective of the effort in restoring marsh productivity and health. In Casco Bay, we worked with a broad cross section of people from the area; one could also use a local high school science program to help provide the labor and analyze the resulting data. The Phase II data sheets and instructions are in the Appendices.

The data from Phase II is plotted as a tidal curve that dramatically illustrates the effect of a restrictive crossing on the tide level.

[[Insert Figure 15- Sample Phase II Tidal Curve]]

### Phase II Follow up

The data obtained in Phase II is used to create a crossing inventory for use by all interested parties. The inventory will be included in a regional database of potential restoration sites. Once the inventory is finished and the results are entered into the database or GIS map, you have a pretty accurate picture of the tidal crossings in the study area and have identified the problem crossings. At this point, the data may be used to select sites for further study or remedial action, which we identify as Phase III of the project (see Section 3: Making Restoration Happen). In Phase III, the participation of resource professionals from groups like the Maine Audubon Society or the Wells Estuarine Research Reserve and state and federal government agencies with expertise in full-scale marsh assessment and restoration is appropriate and necessary. The goal of Phase II is to provide information to officials, organizations and citizens that will help develop local and regional priorities for restoration projects.

At this point, you have a pretty good sense of where the problem situations are and, based on our experience in Casco Bay; you may also have a strong sense of what the necessary remedial action might be. In some cases, the remedial action might not require a permit and will consist of developing simply of removing debris and other obstructions that have collected around a particular culvert and are causing flow restrictions. These clean-up situations may be more common than one would initially expect. In other cases, the Phase II assessment process may have turned up a serious structural problem with a culvert so that remedial action (including widening the culvert during the repair) will be a priority for the local or state highway department to prevent damage to the roadway.

In most cases, however, the need for remedial action will be less straightforward. There may be flooding concerns with upstream landowners that need to be addressed; there may be sediment buildup above the restriction that must be evaluated; the upstream resources may not be exhibiting any signs of trouble despite an apparent restriction; if state or federal funding is required, the project will have to be compared to other

competing projects in other areas for a variety of criteria.

We recommend that the results of Phases I and II be evaluated by local organizations and that an action plan be developed and endorsed to guide activities and assign responsibilities for further action to various organizations. In addition to the work associated with the sites that require further assessment and technical evaluation, we believe that an on-going monitoring program of all tidal wetlands in coastal Maine would be an important activity for watershed, water quality monitoring, and land trust organizations.