A Management Plan to Address Wildlife Related Impairments for the Bay of Quinte Area of Concern

Prepared by: Paul Johanson and Brad McNevin

Bay of Quinte Remedial Action Plan
March 31, 2007
Preparation of this plan was funded by the Ontario Ministry of Natural Resources (Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem) and Canada’s Great Lakes Sustainability Fund. Although this report has undergone review, it does not necessarily represent the views of either funding partner.

A special thanks to the agencies that provided valuable contributions to the development of this document. Specifically, to those members of the steering committee including:

Barry Jones – Bay of Quinte Remedial Action Plan;
Carolyn O’Neill – Environment Canada;
Greg Grabas - Canadian Wildlife Service;
Mark Ferguson – Department of Fisheries and Oceans;
Shawn Meyer – Canadian Wildlife Service;
Tim Trustham - Quinte Conservation;
Todd Norris – Ministry of Natural Resources;
Tom Beaubiah - Cataraqui Region Conservation Authority;

Photo credits (cover page)

*Northern Leopard Frog (top): Paul Johanson*
*Wetland fringe: Paul Johanson*
*Osprey: Russ Kitchen*
*Sawguin Creek marsh: Paul Johanson*
*Muskrat: U.S. Fish and Wildlife Service*
Executive Summary

In 1990, the Bay of Quinte Remedial Action Plan (BQRAP) Stage 1 Report identified a loss of fish and wildlife habitat as one of 14 impaired beneficial uses (IBUs) for the Bay of Quinte Area of Concern (AOC). At this time no wildlife population impairments (IBU 3) were identified for the area, however, there is clear rationale for including wildlife populations in this plan. First, wildlife populations are not static and it should be demonstrated that they have not become impaired. Second, wildlife populations are a reflection of habitat, which was deemed impaired. Third, due to the importance of wildlife populations to the local community, there is a need to assure the public that wildlife populations are not impaired. Finally, the BQRAP may need to demonstrate as part of the delisting process that wildlife populations are not impaired.

This plan provides action based recommendations and interim delisting criteria to guide BQRAP efforts to restore wildlife related impairments in the AOC. These updated criteria provide measurable, quantifiable and defensible targets to support delisting the AOC based on IBUs 3 and 14. The following is a list of the seven criteria that directly relate to fish and wildlife habitat (FWH; IBU 14) and four criteria linked to wildlife populations (WP; IBU 3).

- **FWH-1** - The extent (surface area) of submerged aquatic vegetation in the Bay of Quinte has been restored to levels more reflective of the mesotrophic system that existed in the Bay of Quinte before nutrient loading created a eutrophic/hyper-eutrophic system.
  - **Current Status** - Not impaired
- **FWH-2** - Submerged aquatic vegetation in Bay of Quinte wetlands have an average score of 60 or above using the Durham Region Coastal Wetland Monitoring Project (DRCWMP) methodology (EC and CLOCA 2007).
  - **Current Status** - Not impaired
- **FWH-3** - Coastal wetlands have water quality that meets a score of 3.5 or above using the DRCWMP methodology.
  - **Current Status** - Impaired
- **FWH-4** - Shorelines around the Bay of Quinte have an acceptable level of natural vegetation which protects water quality and contributes to fish and wildlife habitat.
  - **Current Status** - Unknown (likely impaired)
- **FWH-5** - Implement the institutional arrangements and site specific habitat rehabilitation recommendations outlined in the BQRAP Fish Habitat Management Plan.
  - **Current Status** - Future assessment required
- **FWH-6** - Implement the institutional arrangements and site specific habitat rehabilitation recommendations outlined in the BQRAP’s ‘A Management Plan to Address Wildlife Related Impairments for the Bay of Quinte Area of Concern’ (pp 25-31).
  - **Current Status** - Future assessment required
- **FWH-7** - Complete Natural Heritage Reports for all local governments bordering the Bay of Quinte and ensure that they are implemented into the Official Plans of the local governments.
  - **Current Status** - Incomplete
- **WP-1** - Healthy amphibian populations in Bay of Quinte coastal wetlands.
  - **Current Status** - Impaired (conditional)
- **WP-2** - Healthy wetland bird populations in Bay of Quinte coastal wetlands.
  - **Current Status** - Not Impaired (conditional)
- **WP-3** - Shoreline habitat is suitable for supporting raptors.
  - **Current Status** - Not impaired
- **WP-4** - Species at risk recovery plans are to be supported
  - **Current Status** - Requires future assessment

In addition to the updated delisting criteria, this report provides focal areas and recommendations to meet the delisting criteria. Ensuring IBUs 3 and 14 are restored and remain 'unimpaired' will require a strong regulatory framework, a scientific understanding of the status of impairments, public support for habitat initiatives and the completion of required habitat enhancement work to offset historical losses. No one component can successfully restore IBUs 3 and 14 – a comprehensive approach is required. Recommendations contained in this plan fall within four focal areas and are summarized in the following table:

<table>
<thead>
<tr>
<th>Focal Area</th>
<th>Recommendation</th>
<th>Recommendation Type</th>
<th>Implementer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Habitat management framework</td>
<td>Complete Natural Heritage Reports for areas bordering the Bay of Quinte</td>
<td>Action based – supports delisting criterion FWH-7</td>
<td>BQRAP and Prince Edward County</td>
</tr>
<tr>
<td>2: Research and monitoring needs</td>
<td>Ensure monitoring is completed for representative coastal wetlands as per the augmented Marsh Monitoring Program (MMP)</td>
<td>Action based – supports delisting criteria FWH-6, WP-1 and WP-2</td>
<td>BQRAP</td>
</tr>
<tr>
<td></td>
<td>Complete the coastal wetland monitoring in the Bay of Quinte following DRCWMP methodology</td>
<td>Action based – supports delisting criteria FWH-2 and FWH-3</td>
<td>BQRAP</td>
</tr>
<tr>
<td>3: Education and Outreach</td>
<td>Enhance communication with resource users and the public</td>
<td>Institutional commitment – supports delisting criteria FWH–6 and FWH-5</td>
<td>BQRAP</td>
</tr>
<tr>
<td>4: Habitat protection and restoration</td>
<td>Shoreline naturalization program incorporating outreach, education and stewardship activities</td>
<td>Action based – supports delisting criterion FWH-4</td>
<td>BQRAP</td>
</tr>
<tr>
<td></td>
<td>BQRAP actively seek out potential land acquisition and/or conservation agreements with support from partner agencies</td>
<td>Institutional commitment – supports delisting criterion FWH–6 and possibly WP–1 through WP–4 depending on site features</td>
<td>BQRAP</td>
</tr>
<tr>
<td></td>
<td>Maintenance of existing nesting platforms and establishment of additional nesting platforms for Bald Eagle and Osprey</td>
<td>Action based – supports delisting criterion WP–3</td>
<td>BQRAP</td>
</tr>
<tr>
<td></td>
<td>Support species at risk recovery plans</td>
<td>Action based – supports delisting criterion WP-4</td>
<td>BQRAP</td>
</tr>
</tbody>
</table>

Completion of recommendations contained in this report should be required before IBUs 3 and 14 can be considered restored.
Table of Contents

Executive Summary .............................................................................................................. 3

1.0 Introduction ..................................................................................................................... 7
  1.1 Bay of Quinte Impaired Beneficial Uses (IBUs) ............................................................ 7
  1.2 Location and characteristics of the Bay of Quinte watershed ...................................... 9
  1.3 Impacts on wildlife habitat............................................................................................ 9
  1.4 Study area .................................................................................................................... 14
  1.5 Partners in conservation ............................................................................................ 14

2.0 Purpose and impairment status....................................................................................... 15
  2.1 Delisting criteria in the 2001-2005 BQRAP Work Plan .............................................. 15
  2.2 Interim delisting criteria .............................................................................................. 16
    2.2.1 IBU 14: Loss of fish and wildlife habitat............................................................... 17
    2.2.2 IBU 3: Degradation of fish and wildlife populations ............................................ 22

3.0 Focal areas and recommendations to meet delisting criteria ........................................ 28
  Focal area 1: Habitat management framework................................................................. 28
  Focal area 2: Research and monitoring needs .................................................................. 29
  Focal area 3: Education and outreach ............................................................................. 31
  Focal area 4: Habitat protection and restoration ................................................................. 31

4.0 References ..................................................................................................................... 36

List of Tables

TABLE 1. SUMMARY OF IMPAIRED BENEFICIAL USES, AS DEFINED BY THE GREAT LAKES WATER QUALITY AGREEMENT, FOR THE BAY OF QUINTE AREA OF CONCERN (AOC) IN THE BQRAP STAGE 1 REPORT (1990). ............................................................................................................ 7
TABLE 2. EXAMPLES OF WILDLIFE HABITAT IMPACTS AND STRESSORS IN THE BAY OF QUINTE AREA OF CONCERN (AOC). ............................................................................................................. 12
TABLE 3. BQRAP INTERIM DELISTING CRITERIA FOR IBU 14: LOSS OF FISH AND WILDLIFE HABITAT. .................................................................................. 18
TABLE 4. BQRAP INTERIM DELISTING CRITERIA FOR IBU 3: DEGRADATION OF FISH AND WILDLIFE POPULATIONS .................................................................................................................. 23

List of Figures

FIGURE 1: BAY OF QUINTE WATERSHED WITH SUB-WATERSHED DRAINAGE AREAS .......... 10
FIGURE 2: BAY OF QUINTE ILLUSTRATING THE UPPER, MIDDLE AND LOWER BAYS .......... 11
List of Appendices

Appendix I: Examples of exotic invasive species within the Bay of Quinte watershed and surrounding areas.

Appendix IIa: Conservation partners working in the Bay of Quinte watershed

Appendix IIb: Summary of selected habitat initiatives within the Bay of Quinte Watershed

Appendix III: Federally-listed species at risk within the Bay of Quinte Area of Concern, with emphasis on coastal wetland species

Appendix IV: Suggested representative coastal wetlands for monitoring in the Bay of Quinte Area of Concern.
1.0 Introduction

1.1 Bay of Quinte Impaired Beneficial Uses (IBUs)

In 1985 the Bay of Quinte was identified as one of 43 Great Lakes Areas of Concern (AOCs) due, in part, to excessive nutrient enrichment, nuisance algae growth, low concentrations of dissolved oxygen in bottom waters and localized bacterial conditions (BQRAP Stage 1 Report, 1990). AOCs are severely degraded geographic areas within the Great Lakes basin and are defined by the U.S.-Canada Great Lakes Water Quality Agreement (GLWQA) as “geographic areas that fail to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area’s ability to support aquatic life”. An IBU is defined as a change in the chemical, physical or biological integrity of the Great Lakes system that is sufficient to cause any of the 14 problems listed in Table 1.

Table 1. Summary of Impaired Beneficial Uses, as defined by the Great Lakes Water Quality Agreement, for the Bay of Quinte Area of Concern (AOC) in the BQRAP Stage 1 Report (1990).

<table>
<thead>
<tr>
<th>Bay of Quinte Impaired Beneficial Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ 1.1 Restrictions on fish consumption</td>
</tr>
<tr>
<td>x 1.2 Restrictions on wildlife consumption</td>
</tr>
<tr>
<td>x 2. Tainting of fish and wildlife flavour</td>
</tr>
<tr>
<td>✓ 3.1 Degradation of fish populations</td>
</tr>
<tr>
<td>x 3.2 Degradation of wildlife populations</td>
</tr>
<tr>
<td>? 4. Fish tumours or other deformities</td>
</tr>
<tr>
<td>x 5. Bird or animal deformities or reproduction problems</td>
</tr>
<tr>
<td>✓ 6. Degradation of benthos</td>
</tr>
<tr>
<td>✓ 7. Restrictions on dredging activities</td>
</tr>
<tr>
<td>✓ 8. Eutrophication or undesirable algae</td>
</tr>
<tr>
<td>✓ 9. Restrictions on drinking water consumption, or taste and odour problems</td>
</tr>
<tr>
<td>✓ 10. Beach closings</td>
</tr>
<tr>
<td>✓ 11. Degradation of aesthetics</td>
</tr>
<tr>
<td>x 12. Added costs to agriculture or industry</td>
</tr>
<tr>
<td>✓ 13. Degradation of phytoplankton and zooplankton populations</td>
</tr>
<tr>
<td>✓ 14.1 Loss of fish habitat</td>
</tr>
<tr>
<td>✓ 14.2 Loss of wildlife habitat</td>
</tr>
</tbody>
</table>

✓ - identified for the Bay of Quinte AOC
x - not identified for the Bay of Quinte AOC
? - undergoing further evaluation

Under the GLWQA the Canadian and American federal governments agreed to cooperate with state and provincial governments to develop and implement Remedial Action Plans (RAPs) for each AOC to restore and protect the IBUs. RAPs identify specific problems in an AOC and provide recommended actions for correcting them. As outlined in Annex 2 of
the GLWQA, each RAP should take an ecosystem approach to restoring and protecting beneficial uses in AOCs.

Ten IBUs were identified for the Bay of Quinte AOC in the 1990 BQRAP Stage I Report, Environmental Setting and Problem Definition, as shown in Table 1. In terms of the wildlife component of the fish and wildlife IBUs, *loss of fish and wildlife habitat* (IBU 14) was identified for the Bay of Quinte, however, wildlife populations (IBU 3) and wildlife consumption (IBU 1) were not considered to be impaired. In the 'Fish and Wildlife Habitat' section of the Stage 1 Report under ‘Key Concerns’ the following explanation was provided:

Nearshore and deepwater habitats of the Bay of Quinte have been altered, fragmented and/or lost. To date, remedial measures and abatement have focused on the obvious causes of degradation. A need exists to direct attention on protecting and maintaining the existing supply of fish and wildlife habitat and, even more importantly, on re-establishing some of the rooted (aquatic) plant communities that existed 50-60 years ago. Such actions would offset lost opportunities for fish and wildlife harvest and increase non-consumptive recreational uses.

Regarding *loss of fish and wildlife habitat* (IBU 14) it was noted that:

Loss of fish and wildlife habitat has been identified as an impaired beneficial use. An estimated 12,000 hectares (ha) of wetland has been converted to other uses. Historical modification of shoreline can be attributed to the degree of eutrophication, and man’s activities including growth pressures, lack of adequate legislation, no available management policies, no concept or process of ecosystem management and/or changes in long-term Great Lakes water levels.

Regarding *degradation of fish and wildlife populations* (IBU 3) it was noted that:

The fish communities in the bay are self-reproducing and typical of eutrophic systems; however, they are not diverse. A collapse of one or more species could translate into lost angling opportunities and a further unbalanced system. There is no documented, observational or anecdotal evidence of degraded wildlife populations.

Regarding *restrictions on fish and wildlife consumption* (IBU 1) it was noted that:

In 1992 consumption advisories were in place for three fish species: walleye (length greater than 55-cm), channel catfish (length greater than 45-cm), and American eel (length greater than 45-cm). The number of species of fish listed was reduced from seven in 1991 to three in 1992. PCB levels in young-of-year spottail shiners have been reduced. Wildlife consumption is not restricted. Pollution sources are being identified.
1.2 Location and characteristics of the Bay of Quinte watershed

Detailed descriptions of wildlife habitat and species, vegetation communities, Areas of Natural and Scientific Interest (ANSIs) and wooded areas were compiled for Bay of Quinte AOC subwatersheds in the ‘Wildlife Backgrounder’ (McNevin, 2005). In general, two distinct ecozones are present in the Bay of Quinte AOC, the Boreal Shield Ecozone and the Mixedwood Plains Ecozone. The northern section (Boreal Shield) comprises approximately 43 per cent of the Bay of Quinte watershed (Figure 1) and is characterized by relatively low human disturbance and healthy forests, lakes, rivers and wetlands. The remaining 47 per cent of the Bay of Quinte watershed, the Mixedwood Plains Ecozone, is characterized by extensive human influence including agriculture, industrial and urban development and an extensive road network including Highway 401 which essentially limits north-south migration of land-based wildlife in the watershed to bridges, overpasses and culverts.

The Bay of Quinte is a narrow “Z”-shaped bay on the northeastern shore of Lake Ontario. The Bay is approximately 100 km long and covers an area of approximately 254 km², stretching from the western end of the Bay near Trenton to Amherst Island in the east. It is comprised of three distinct bays, the upper, middle and lower (Figure 2). The upper bay is relatively shallow, rarely exceeding five metres in depth. The Bay of Quinte flushes from the west to the east, where it opens into Lake Ontario. Flushing in the upper bay occurs primarily due to inflow from the Trent, Moira, Salmon and Napanee Rivers. The middle bay is deeper than the upper bay, with an average depth of 5.2-m. The lower bay is much deeper with an average depth of 24.4-m and maximum depths greater than 55-m. Differences in physical characteristics among the upper, middle and lower bays result in very different habitat conditions. For example, the shallow upper bay contains extensive areas of submerged aquatic vegetation providing valuable waterbird habitat and also contains the vast majority of coastal wetland habitat in the Bay of Quinte. Urban and industrial development has been most intensive along the shores of the upper bay, resulting in greater loss of aquatic, terrestrial and riparian habitat in this area.

1.3 Impacts on wildlife habitat

Impacts on wildlife habitat in the Bay of Quinte have resulted from a variety of human activities. Conversion of the natural forested landscape to a primarily agricultural setting resulted in a substantial loss of wildlife habitat although some relatively undisturbed areas for wildlife remain. As the human population within the Bay of Quinte watershed grows and development pressure continues, these remaining patches of wildlife habitat are under increasing pressure.

Some of the primary wildlife habitat impacts in the Bay of Quinte area are summarized in Table 2. For each of the habitat impacts, the past/existing management response to each is described.
Figure 1: Bay of Quinte Area of Concern Watershed with Sub-watershed drainage areas
Figure 2: Bay of Quinte illustrating the upper, middle and lower bays.
Table 2. Examples of wildlife habitat impacts and stressors in the Bay of Quinte Area of Concern (AOC).

<table>
<thead>
<tr>
<th>Habitat Impact and Stressor to Habitat</th>
<th>Description</th>
<th>Management response/options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water level regulation</td>
<td>Regulation of Lake Ontario water levels has reduced amplitude and variability of natural water level fluctuations responsible for maintaining coastal wetland habitat diversity.</td>
<td>In 2006, the International Joint Commission completed a review of water level management of Lake Ontario, possibly resulting in the adoption of an alternative water level regulation regime that includes increased interannual variability in water levels (International Lake Ontario and St. Lawrence River Study Board)</td>
</tr>
<tr>
<td>Infilling of coastal wetlands</td>
<td>Historical infilling of coastal wetlands around the Bay of Quinte resulted in the significant loss and degradation of wildlife habitat. It has been estimated that 12,000 ha of wetland habitat was lost within 3.2 km of the Bay of Quinte (BQRAP Time to Act, 1993).</td>
<td>Improved provincial policies and municipal regulations and planning policies to protect wetland habitat, particularly Provincially Significant Wetlands (PSW).</td>
</tr>
<tr>
<td>Loss of shoreline habitat</td>
<td>Shoreline and riparian habitat has been described as the &quot;ribbon of life&quot;, acknowledging the diverse and important transitional habitat that these areas represent. These areas are typically prime real estate and are therefore under immense development pressure.</td>
<td>Little has been done to stem the loss of shoreline vegetation and habitat. Funding programs (such as Greencover Canada, Wetland Habitat Fund, local Conservation Authority programs, etc.) promote conservation of shorelines and provide funding in some cases to assist shoreline naturalization.</td>
</tr>
<tr>
<td>Fragmentation of habitat in watershed</td>
<td>Clearing of land for agriculture and development, and the associated infrastructure has caused most wildlife habitat to be dissected into smaller fragments resulting in the loss of forest interior habitat and corridors linking valuable habitat types.</td>
<td>Improved planning policies and procedures (Provincial Policy Statement on Natural Heritage, Official and secondary plans for municipal and county government levels, etc.) for future developments.</td>
</tr>
<tr>
<td>Climate Change</td>
<td>Climate change holds the potential to fundamentally alter habitat and affect wildlife. The potential impacts, too numerous to describe in the context of this report, range from increased disease to lower water levels. Decreased water levels would have a direct link to wildlife habitat loss as many coastal wetland areas could dry up and potentially lose the diversity of plant life that many wildlife species depend on. Efforts to establish a global program to curb greenhouse gas emissions have been met with mixed results. Canada committed to reduce its greenhouse gas emissions to six per cent below 1990 levels by 2008-2012, but instead, emissions have risen to 24 per cent above 1990 levels. Although there is a need to recognize that climate change impacts may be felt in the Bay of Quinte watershed, from a RAP perspective there is little that can be done to influence this stressor.</td>
<td></td>
</tr>
<tr>
<td>Exotic Invasive Species</td>
<td>The introduction of exotic invasive species can have many effects on wildlife including the physical alteration of habitat, spread of disease or competition for resources with native wildlife. See Appendix 1 for a summary of some of the exotic invasive species found within the Bay of Quinte AOC and surrounding areas. The Bay of Quinte has several exotic invasive species and includes (but not limited to) zebra mussels, rusty crayfish, ruffe, round goby, Eurasian watermilfoil, European frogbit, and more. Movement of non-indigenous wildlife is regulated under various provincial and federal legislations. Efforts to develop legally binding and comprehensive ballast water regulations have been slow in Canada. Recent agreements have not included No Ballast on Board (NOBOB) vessels, weakening the regulations.</td>
<td></td>
</tr>
<tr>
<td>Pollution</td>
<td>IBU 5 (<em>Bird or animal deformities or reproductive problems</em>) was not identified for the Bay of Quinte AOC. Although there are specific sites in the AOC that warrant ongoing investigation (e.g., mouth of the Trent River) overall, chemical pollutants are not felt to impair habitat quality in the Bay. Ongoing efforts to continually improve the water quality in the Great Lakes through the GLWQA and the <em>Canadian Environmental Protection Act</em> (e.g., stormwater management planning for municipality’s abutting the Bay of Quinte).</td>
<td></td>
</tr>
</tbody>
</table>
1.4 Study area

Given the enormous size of the Bay of Quinte AOC watershed (almost 18,000 km$^2$), the study area was strategically focused to a manageable size for the purposes of developing a plan to address wildlife related impairments. This need was identified in the Wildlife and Wildlife Habitat Backgrounder of the Bay of Quinte (McNevin, 2005) – the precursor to this document.

In January 2006, the Bay of Quinte Restoration Council accepted a motion for scoping the geographical boundaries of the AOC for the purposes of developing a plan to address wildlife related IBUs. The recommended option was to focus the plan on the Bay of Quinte and its shorelines and coastal wetlands. Some of the key considerations for accepting this area to be the focal point included:

- Maintaining focus on original rationale for considering wildlife habitat an IBU;
- Coordination with the fish habitat plan;
- Cost effectiveness and practicality;
- Ecological significance; and,
- Role of other initiatives/partnerships in addressing watershed concerns.

This approach strategically focuses limited resources on those areas most related to the rationale for identifying IBU 14 (see above); it allows for effective integration with the fish habitat management plan which focuses on the Bay and its coastal and shoreline areas; it will allow for the development of cost effective and practical recommendations; and it is complemented by numerous partnerships (see below) within the broader watershed (Appendix IIa and IIb). Keeping with an ecosystem approach, the BQRAP may support initiatives in the watershed that contribute to restoration of wildlife related IBUs, however, the focus of this plan will be on the Bay of Quinte and its shorelines and coastal wetlands.

1.5 Partners in conservation

The contribution that conservation groups (government and non-government) make to protecting and enhancing wildlife habitat continues to grow as public awareness increases and the link between environmental and human health becomes increasingly apparent. In the Bay of Quinte watershed, there are countless organizations and dedicated volunteers working to protect and restore habitat for wildlife. Appendix IIa and IIb provide a list of some of the organizations and habitat initiatives that support BQRAP objectives in the AOC.
2.0 Purpose and impairment status

The purpose of this plan is to guide the BQRAP’s actions related to restoration of wildlife related impairments (IBUs 3 and 14). Developing such a plan requires an assessment of the current status of the impairments and then the development of strategies to address outstanding deficiencies. In the case of IBU 14, loss of fish and wildlife habitat, the BQRAP Stage I Report (1990) provided rationale for considering fish and wildlife habitat impaired. This provides a foundation for assessing progress and determining impairment status.

Although BQRAP Stage I and II Reports stated there was no wildlife population impairments (without explanation), there is clear rationale for including wildlife populations in this plan. First, wildlife populations are not static and it should be demonstrated that they have not become impaired. Second, wildlife populations are a reflection of habitat, which was deemed impaired. Third, due to the importance of wildlife populations to the local community, there is a need to assure the public that wildlife populations are not impaired. Finally, the BQRAP may need to demonstrate as part of the delisting process that wildlife populations are not impaired.

2.1 Delisting criteria in the 2001-2005 BQRAP Work Plan

Determining the health, or status, of wildlife habitat and populations is a complex task, given the diversity of habitats, communities and range of stressors on habitat and populations. It is not feasible to assess all aspects of wildlife habitat and all wildlife populations in the Bay of Quinte AOC. Instead, delisting criteria are used by RAPs to focus remedial efforts and to track progress. In 2001, the BQRAP established a set of delisting criteria (called delisting targets) to guide the 2001-2005 BQRAP Work Plan (see below). In general, the delisting criteria were broad statements about ecosystem health or completion of reports, without quantifiable or measurable endpoints. Moreover, key terms such as “stable”, “healthy” or “diverse” were not defined.

**IBU 3: Degradation of fish and wildlife populations**

Delisting targets:
- Demonstrate that key fish and wildlife species including walleye, bass and pike, are present in numbers consistent with a stable, diverse and healthy aquatic ecosystem.
- Demonstrate that key indicator species for upland wetlands and forests are present and in sufficient numbers to be self-sustaining.

How the target will be measured:
- Demonstrate that key fish and wildlife species are present in numbers consistent with an unimpaired ecosystem.
- Demonstrate that walleye, bass and pike populations are all self-reproducing and that none of these species dominates the fish community.
- Demonstrate that targeted fish and wildlife species are healthy, abundant and self-sustaining in the Bay of Quinte area given the impact and influence of key factors such
as habitat availability, habitat features (e.g., impacts of exotics), human interactions (e.g., wildlife harvesting), and other factors (e.g., toxic contaminants).

- Through wildlife monitoring programs, demonstrate that key indicator species for coastal and upland wetlands and existing forests are present and in significant numbers to be self-sustaining.

**Impaired Beneficial Use 14: Loss of fish and wildlife habitat**

**Delisting criteria:**

- To the greatest extent possible, protect the quantity, function, and diversity of significant natural features as identified in Natural Heritage Strategies completed for partnering municipalities and First Nations fronting on the Bay of Quinte.
- To the greatest extent possible, protect and restore fish habitat in the Bay of Quinte.
- Encourage municipalities and broad public and sectoral support/advocacy for the availability, findings and recommendations contained in Natural Heritage Strategies.
- Establish a self-sustaining, volunteer, community-based wildlife monitoring program for the Bay of Quinte area.

**How the target will be measured:**

- Natural Heritage Strategies will be completed.
- The use of the Natural Heritage Strategies will be monitored with respect to municipal planning.
- The Ontario Ministry of Natural Resources (OMNR) Fish Community Objectives will be adopted, and actions taken to monitor achievement of the objectives.
- A Bay of Quinte Fisheries Habitat Management Strategy will be completed.
- An education and awareness program will be developed and implemented to gain support for the Natural Heritage Strategies and the Fish Habitat Management Strategy.
- A stewardship program will be developed and delivered for the protection, creation and rehabilitation of fish habitats identified in the Natural Heritage Strategies and the Fish Habitat Management Strategy.
- A communications plan will be developed and implemented.
- A strategy will be developed and implemented for recruiting and coordinating volunteers for existing “wildlife watchers” programs (e.g., Marsh Monitoring Program).

**2.2 Interim delisting criteria**

Like other RAPs that had general delisting criteria statements, the BQRAP has undertaken the task to update its delisting targets and develop measurable, quantifiable and defensible delisting criteria for IBUs 3 and 14. Tables 3 and 4 outline the 2006 interim delisting criteria for the wildlife related aspects of IBUs 14 and 3, respectively. Delisting criteria FWH-5 (Implementation of the Fish Habitat Management Plan) have also been included in Table 3 to show the full suite of delisting criteria for IBU 14 since some of the recommendations in the fish plan also affect wildlife habitat. Delisting criteria for fish populations have not been shown in Table 4 – these are discussed in the Fish Habitat Management Plan for the Bay of Quinte (BQRAP, 2007 – in prep.). Following each table a discussion of each delisting criterion is provided. The 2006 interim delisting criteria were developed taking into
consideration a number of practical and scientific factors. In general, interim delisting criteria were developed that:

- Addressed the IBUs identified in RAP documents (Stage 1, 1990);
- Utilized established monitoring programs with defensible methodologies;
- Had measurable and achievable endpoints;
- Were consistent with provincial and federal wildlife management policy,
- Utilized species that reflect conditions within the AOC and minimized influence from outside the AOC;
- Addressed spatial variability in environmental quality (i.e., using representative coastal wetlands);
- Gave preference to community based indices, over single-species indicators; and,
- Allowed for comparisons with AOC and non-AOC areas.

The BQRAP 2006-2010 Work Plan has called for the review and revision of delisting criteria as necessary. As part of this process, there will be public consultation and interim delisting criteria proposed in this document will be publicly presented at that time.

2.2.1 IBU 14: Loss of fish and wildlife habitat

Overall, the current status of IBU 14 from a wildlife habitat perspective should be considered **impaired, on a conditional basis**. Delisting criteria measures and status for IBU 14 are provided in Table 3. Explanations of these delisting criteria follow the table, and are provided for wildlife related delisting criteria only.

Significant progress has been made towards restoring aquatic vegetation in the Bay through nutrient abatement programs and the impact of zebra mussels on water clarity. Restoration of aquatic vegetation to large areas of the Bay was seen as a major goal of the RAP and indicative of positive ecosystem change. Moreover, policy, regulatory and planning changes now offer greater protection for wetlands and shoreline areas relative to the time of listing the Bay of Quinte as an AOC. Recent measures of coastal wetland quality are encouraging, but are based on limited assessments and more data are required. However, there is ongoing pressure on Bay of Quinte shorelines from development and this must be addressed as part of restoring IBU 14 (part of which is loss and degradation of coastal habitats).

**FWH-1 – Coverage of submerged aquatic vegetation in the Bay of Quinte: Not impaired**

Submerged aquatic vegetation (SAV) provides valuable habitat for waterbirds and shoreline and marsh nesting birds and is affected by environmental quality, making it a key indicator of aquatic ecosystem health. Restoration of SAV in the Bay of Quinte has been made possible by reductions in phosphorous inputs through improvements in sewage treatment processes, elimination of phosphorous based detergents and improvements in land
Table 3. BQRAP interim delisting criteria for IBU 14: loss of fish and wildlife habitat. Shaded rows relate primarily to the fish habitat component of IBU 14.

<table>
<thead>
<tr>
<th>Delisting Criteria Code</th>
<th>Delisting Criteria Description</th>
<th>Current Status</th>
</tr>
</thead>
</table>
| FWH-1                   | The extent (surface area) of submerged aquatic vegetation in the Bay of Quinte has been restored to levels more reflective of the mesotrophic system that existed in the Bay of Quinte before nutrient loading created a eutrophic/hyper-eutrophic system.  
  • Criteria for submerged aquatic vegetation (i.e., macrophytes) restoration, as set out in IBU 8 (Eutrophication and undesirable algae), has been met. | Not impaired                 |
| FWH-2                   | Submerged aquatic vegetation in Bay of Quinte wetlands is not impaired.  
  • The average submerged aquatic vegetation Index of Biotic Integrity (IBI) at representative coastal wetlands (Appendix IV) will be 60 or above (very good or better) using the DRCWMP: Methodology Handbook (EC and CLOCA 2007) to collect data and EC and CLOCA (2004) for data analysis, and is stable or improving based on multi-year assessments. However, no more than three of the coastal wetland sites can score less than 60. This target and criteria is based on expert advice provided by the Canadian Wildlife Service (CWS) and the current conditions of Bay of Quinte coastal wetlands. | Not impaired                 |
| FWH-3                   | Coastal wetland water quality  
  • The average water quality parameter scores at representative Bay of Quinte coastal wetlands (Appendix IV) will be 3.5 (good) or above following (Environment Canada 2007 – in prep.), and is stable or improving based on multi-year assessments. However, no more than three of the coastal wetland sites can score less than 3.33. This target and criteria is based on expert advice provided by CWS and the current conditions of Bay of Quinte coastal wetlands. | Impaired                     |
| FWH-4                   | Shorelines around the Bay of Quinte have an acceptable level of natural vegetation which protects water quality and contributes to fish and wildlife habitat.  
  • An undisturbed terrestrial vegetated buffer of 30-m along shorelands and 120-m adjacent to Provincially Significant Wetlands (PSW).  
  • 80 percent of the shorelines along the Bay of Quinte must have an | Unknown (likely impaired)    |
undisturbed natural terrestrial vegetative buffer of five metres or greater from the high water mark. From five metres to thirty metres (or 120-m for PSW) the extent of the buffer should be 60 percent naturally vegetated. This criterion may be revised pending initial field verification that will examine current extent of buffering within the 30-m and 120-m areas of the Bay of Quinte.

<table>
<thead>
<tr>
<th>FWH-5</th>
<th>Implement the institutional arrangements and site specific habitat rehabilitation recommendations outlined in the Bay of Quinte Remedial Action Plan Fish Habitat Management Plan.</th>
<th>Future assessment required.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FWH-6</td>
<td>Implement the institutional arrangements and site specific habitat rehabilitation recommendations outlined in the Bay of Quinte Remedial Action Plan ‘A Management Plan to Address Wildlife Related Impairments for the Bay of Quinte Area of Concern’ (pp 25-31).</td>
<td>Future assessment required</td>
</tr>
<tr>
<td>FWH-7</td>
<td>Complete Natural Heritage Reports for all local governments bordering the Bay of Quinte and ensure that they are implemented into the Official Plans of the local governments.</td>
<td>Incomplete</td>
</tr>
<tr>
<td>OVERALL</td>
<td></td>
<td>IMPAIRED (conditional)</td>
</tr>
</tbody>
</table>
management. In addition, the unexpected introduction of zebra mussels has improved water clarity.

The Great Lakes Laboratory for Fisheries and Aquatic Sciences (GLLFA) completed an assessment of submerged aquatic vegetation for the Bay of Quinte (Leisti et al., 2006) which supported that the delisting criteria 8.3 for IBU 8 (Eutrophication or undesirable algae) had been met. This delisting criterion stated “Using 1986-1994 as a “base year period”, increase area of submerged aquatic macrophytes (i.e., vegetation) so that 30% of the upper Bay of Quinte has macrophyte coverage of more than 50%....that is, from about 38 \( km^2 \) to 45 \( km^2 \) or about a 20% increase in the area of submerged aquatic macrophytes in the upper Bay of Quinte”.

**FWH-2 – Wetland submerged aquatic vegetation: Not impaired**

Coastal wetlands provide valuable fish and wildlife habitat. The type and abundance of SAV found in coastal wetlands is an indication of the health of that wetland and its ability to support wildlife species. In conjunction with an assessment of wildlife populations, measures of wetland health can help develop an overall picture of environmental quality.

Sampling was conducted by Environment Canada - CWS in 2003, 2005, and 2006 (EC 2007). SAV community sampling occurred at 20 upper Bay of Quinte coastal wetlands using the DRCWMP sampling methodology. Data were analyzed as in EC and CLOCA (2004). During 2006 sampling, nine of the ten representative Bay of Quinte coastal wetlands were surveyed (see Appendix IV; Carnachan Bay was not surveyed). The results suggest that SAV communities in the Bay of Quinte AOC are not impaired.

**FWH-3 – Coastal wetland water quality: Impaired**

Water quality has a strong influence on the overall aquatic habitat quality in coastal wetlands. Poor water quality can directly affect fish and wildlife, and can affect fish and wildlife habitat by affecting aquatic vegetation (Environment Canada, 2006). Water quality in coastal marshes is impacted both by water quality in the lake, and inputs from immediate surrounding areas and watersheds.

Environment Canada (2007) documented water quality results for 20 upper Bay of Quinte coastal wetlands. Generally, coastal wetland water quality ranged from good (3-4) to excellent (4-5). During 2006 sampling, water quality was assessed at nine of the ten representative Bay of Quinte coastal wetlands (Appendix IV; Carnachan Bay was not surveyed). The results indicate that the mean water quality score is 3.60 and not more than 3 sites scored below 3.33. Compared against a mean water quality score of 4, the existing data suggest that water quality in Bay of Quinte AOC coastal wetlands is marginally impaired.
FWH-4 – Natural shoreline habitat: Status unknown (likely impaired)

Natural shoreline habitat around the Bay of Quinte has been lost or severely degraded in many areas, and is under ongoing further development pressure. IBU 14 cannot be considered restored if shorelines, which provide diverse and valuable habitat for numerous species, are not protected. The proposed criteria should be viewed as a minimum for delisting to occur, not a preferred state. Ideally, there would be natural vegetation along all Bay of Quinte shorelines, including some areas with large undisturbed natural areas (e.g., forested areas) adjacent to the Bay providing connectivity to upland habitats. However, given the realities of development pressure and existing regulations regarding shoreline development, a target of 80 percent of the shorelines along the Bay of Quinte must have an undisturbed natural terrestrial vegetative buffer of 5-m or greater from the high water mark. From 5-m to 30-m (or 120-m for PSW) the extent of the buffer should be 60 percent naturally vegetated.

The current status of this delisting criterion is unknown and requires field verification. The criteria may be revised pending initial field verification that will examine the current extent of buffering within the 30-m and 120-m areas of the Bay of Quinte. Reid (2001) noted that terrestrial habitats along the Canadian shoreline of Lake Ontario are “in very limited supply and are declining further”. Based on the overall trend in shoreline development and field observations within the Bay of Quinte, this delisting criterion is likely impaired, or is in danger of becoming impaired without remedial or preventative action.

FWH-6 – Implementation of ‘A Management Plan to Address Wildlife Related Impairments for the Bay of Quinte Area of Concern’ recommendations: Requires future assessment.

Completion of actions (both institutional commitments and habitat protection and rehabilitation) identified in this Plan should be seen as a prerequisite for delisting. Future assessment will be required to determine when all reasonable actions have been taken.

FWH-7 – Completion of Natural Heritage Reports: Incomplete

Completion of Natural Heritage Reports (NHRs) for municipalities and other areas adjacent/abutting the Bay of Quinte is an action-based delisting criterion. It complements quantitative targets by describing the Natural Heritage System* that municipalities are directed to protect. Section 3 of the Provincial Planning Act requires that decisions affecting planning matters “shall be consistent with” policy statements under the Act.

*Natural Heritage System means a system made up of natural heritage features and areas, linked by natural corridors which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include lands that have been restored and areas with the potential to be restored to a natural state. Natural heritage features include, amongst other things, significant wetlands, woodlands, valleylands, habitat of endangered and threatened
species, areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area.

NHRs have been completed for the municipalities of Quinte West/Belleville/Trent Hills, and Greater Napanee as well as for the Tyendinaga Mohawk Territory – First Nations. The Mohawks of the Bay of Quinte completed a NHR for Tyendinaga Mohawk Territory in conjunction with the BQRAP in 2006. Because Tyendinaga Mohawk Territory is not provincial land, the Provincial Policy Statement does not apply. However, the NHR will serve a similar function in protecting natural heritage features.

The only outstanding NHR is for Prince Edward County and efforts are currently underway to complete this Report. BQRAP staff and Prince Edward County municipal representatives have been discussing how and when this report will be completed.

2.2.2 IBU 3: Degradation of fish and wildlife populations

The status of IBU 3, from a wildlife populations perspective, should be considered impaired, but on a conditional basis. Delisting criteria measures and status for IBU 3 are provided in Table 4. Explanations for wildlife populations delisting criteria follow the table.

Although the ‘wildlife populations’ beneficial use was not originally deemed impaired, supporting rationale for this assessment was not provided as part of Stage I and II Reports for the BQRAP. However, the BQRAP believes an assessment is necessary now. In order to assess the status of wildlife populations from a RAP perspective, a range of species groups were selected to represent the Bay’s fauna and reflect the status of impaired habitat types. Amphibians and wetland birds were chosen to reflect the condition of coastal wetlands and nesting raptors chosen to reflect shoreline health. A species at risk delisting criteria was included to ensure the BQRAP had taken all reasonable actions to protect biodiversity, recognizing the challenges of safeguarding species at risk. Population based delisting criteria are supported by habitat delisting criteria under IBU 14 and should not be viewed in isolation.

Incorporating a delisting criterion for fur bearing mammals (e.g., river otter, muskrat, mink and beaver) was also considered to ‘round out’ the overview of coastal wetland wildlife. However, data for fur bearing animals (usually trapping data) are heavily influenced by prices and number of trappers, so this prevented the development of quantifiable delisting criteria. The Lake Ontario Lakewide Management Plan (LaMP), based on a review of trapping and sighting information, stated: “These conclusions suggest that the mink and otter indicator objective has been met” (Lake Ontario Lakewide Management Plan, 2006). A contaminants survey, conducted by the CWS, found that trapper-caught mink in the Bay of Quinte and surrounding areas contained concentrations of PCBs and mercury well below those associated with negative reproductive effects (Lake Ontario Lakewide Management Plan, 2006).
Table 4. BQRAP interim delisting criteria for IBU 3: degradation of fish and wildlife populations (only wildlife populations criteria are shown).

<table>
<thead>
<tr>
<th>Delisting Criteria Code*</th>
<th>Delisting Criteria Description</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP-1</td>
<td>Healthy amphibian populations in Bay of Quinte coastal wetlands.</td>
<td>Impaired (conditional)</td>
</tr>
<tr>
<td></td>
<td>• Maintenance of amphibian populations and diversity at or above Great Lakes non-AOC averages (i.e., in Lake Ontario), as determined by the Marsh Monitoring Program (MMP), in a suite of representative Bay of Quinte coastal wetlands.</td>
<td></td>
</tr>
<tr>
<td>WP-2</td>
<td>Healthy wetland bird populations in Bay of Quinte coastal wetlands.</td>
<td>Not Impaired (conditional)</td>
</tr>
<tr>
<td></td>
<td>• Maintenance of wetland bird populations and diversity at or above Great Lakes non-AOC averages (i.e., in Lake Ontario), as determined by the Augmented MMP using IBIs (Environment Canada, 2005), in a suite of representative Bay of Quinte coastal wetlands.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Currently, a consolidated bird community IBI is being developed by members of the Great Lakes scientific community – including CWS and Bird Studies Canada. Once this IBI is developed, a concrete IBI-based delisting criterion can be recommended for WP-2.</td>
<td></td>
</tr>
<tr>
<td>WP-3</td>
<td>Shoreline habitat is suitable for supporting raptors.</td>
<td>Not impaired</td>
</tr>
<tr>
<td></td>
<td>• Presence of nesting ospreys, including the successful fledging of chicks, on or near the Bay of Quinte shoreline each year.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Maintain identified critical natural areas.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Preferred criteria would also include the presence of nesting bald eagles, but this should not be considered a prerequisite for delisting.</td>
<td></td>
</tr>
<tr>
<td>WP-4</td>
<td>Species at risk</td>
<td>Requires future assessment</td>
</tr>
<tr>
<td></td>
<td>• Where appropriate and feasible, support species at risk recovery plans for those plants and animals that reside in the Bay of Quinte.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Maintain existing habitats for species at risk that have been identified in recovery plans.</td>
<td></td>
</tr>
<tr>
<td>OVERALL</td>
<td></td>
<td>IMPAIRED (conditionally)</td>
</tr>
</tbody>
</table>

*only delisting criteria related to wildlife populations are shown (not fish populations).
Amphibians are well known indicators of environmental health due to their sensitivity to pollution and habitat degradation. Data collected by Bay of Quinte volunteers as part of the Marsh Monitoring Program (MMP) allow for comparison between AOC and non-AOC areas, speak directly to a core issue for wildlife habitat (coastal wetland condition) and use established and defensible methodologies. There are data at some Bay of Quinte sites since 1995.

Bird Studies Canada (BSC), which administers the MMP, has stated that “…although the MMP is intended to provide information toward evaluating status of wetlands within AOCs, assessments of these ecosystems’ degree of impairment should be based only partly on our results. The MMP should serve as a complementary source of information in concert with other assessment schemes and other perspectives about AOC wetland functions and integrity” (Timmermans et al., 2004). BQRAP has complemented MMP-based delisting criteria with other measures of ecosystem and wetland health, such as FWH-1 and FWH-2 (above).

The last update on MMP in the Bay of Quinte AOC (Bird Studies Canada, 2004), which covered 1995-2002, stated:

- Of the four amphibian indicator species present (Bullfrog, Chorus Frog, Northern Leopard Frog, Spring Peeper), all species occurrences scored within the average of those at Great Lakes basin non-AOC routes (i.e., in Lake Ontario).
- Total amphibian species diversity scored within the average of that at Great Lakes basin non-AOCs (i.e., in Lake Ontario).
- Amphibian indicator species diversity scored below the average of that at Great Lakes basin non-AOC routes (i.e., in Lake Ontario).
- Overall [including marsh birds], this AOC is apparently impaired in its ability to support a high diversity of marsh-dependent species.

The MMP relies upon volunteers for the collection of data, and as such, data can be limited. Of the 17 sites used in the BQ assessment, 11 were surveyed for only one year and few routes have been surveyed repeatedly for both birds and amphibians. It is recommended that before a final assessment is made on this delisting criterion, data are collected from representative Bay of Quinte coastal wetlands over 2-3 years (at a minimum). See Appendix IV for a list of representative wetlands for the Bay of Quinte. For this reason, and given that amphibian indicator species occurrence and total amphibian species diversity scored within the average of those at Great Lakes basin non-AOC areas (only amphibian indicator species diversity scored below), this delisting criterion status of impaired, should be considered conditional until more comprehensive data are collected.

Consideration should be given to focusing analyses on coastal wetlands and removing routes that are a great distance from the Bay. Three of the routes (DU Good-Varty, Rapids Road and Levere’s) are located over 10-km (and in one case over 50-km) from the Bay of
Quinte – making them less representative of the primary issues being dealt with by the RAP. The Marsh Creek route, sampled once in 1997 and located in an area that did not fall within the site selection criteria, should not be included in any evaluation of Bay of Quinte coastal wetlands. The BQRAP needs to engage and retain MMP volunteers to ensure surveys are conducted at representative sites for a sufficient period of time.

The CWS and BSC are developing IBIs for reporting on amphibians and wetland birds using MMP data. This work is being completed in cooperation with the Great Lakes Coastal Wetland Consortium and the Great Lakes Environmental Indicator Project. The result of this work should be a consistent monitoring and assessment approach for reporting on these communities in the Great Lakes Basin. In the future, delisting criteria should be adapted to reflect improvements in amphibian and bird assessments.

**WP-2 – Wetland bird populations: Not Impaired (conditionally)**

Marsh-dependent bird species are excellent indicators of coastal wetland health and of conditions supporting other wildlife species within the Bay of Quinte. Data collected by Bay of Quinte volunteers as part of the MMP allow for comparison between the AOC and non-AOC areas, speak directly to a core issue for wildlife habitat (coastal wetland condition) and use established and defensible methodologies. There are data at some Bay of Quinte sites since 1995.

The last update on MMP in the Bay of Quinte AOC (Bird Studies Canada, 2004), which covered 1995-2002, stated:

- Abundance of seven marsh bird indicator species (American Bittern, American Coot, Black Tern, Blue-winged Teal, Common Snipe, Least Bittern and Sora) scored within the average of that at Great Lakes basin non-AOC routes (i.e., in Lake Ontario).
- Abundance of five species (Common Moorhen, Marsh Wren, Common Moorhen/American Coot, Pied-billed Grebe and Virginia Rail) scored below the average of that at Great Lakes basin non-AOC routes (i.e., in Lake Ontario).
- Marsh bird indicator species diversity and marsh nesting bird species diversity in the Bay of Quinte scored below the average of those at Great Lakes basin non-AOC routes (i.e., in Lake Ontario).
- The Bay of Quinte AOC was given an impaired rating in its ability to support a diverse array of amphibian and marsh bird species. Overall, this AOC is rated as impaired in its ability to support a high diversity of marsh-dependent species.

Of the 11 routes sampled for marsh birds, seven had been sampled only one year. As with the amphibians delisting criterion, effort must be dedicated by the BQRAP to sample routes in more years, before a more definitive assessment can be made. Until an update is prepared by BSC, this delisting criterion status of impaired should be considered conditional.
The CWS surveyed seven coastal marshes using an augmented MMP protocol in 2005 (Environment Canada, 2006) and derived IBIs for wetland birds in those marshes. In 2006, 20 additional marshes were surveyed. Results from surveys in 2005 indicated that for those sites (typically very healthy marshes) the breeding marsh bird community ranked 'very good' overall, with five of the sites being excellent. Field staff with the CWS also indicated that those seven Bay of Quinte coastal wetlands are not impaired for marsh birds compared to other Lake Ontario Great Lakes coastal wetlands. The CWS will be working with BSC over the next one to two years to improve this IBI for marsh nesting birds. Until representative coastal marshes are selected and sampled more than once, and improvements made in IBI development, statements about impairment status should be considered 'conditional'.

**WP-3 – Presence of nesting raptors on shoreline: Not impaired**

Ospreys have made a dramatic comeback in the Bay of Quinte area over the past 20 years in response to improving environmental conditions (contaminants) and efforts to establish artificial nesting platforms. Successful fledging of osprey young, demonstrate that contaminant levels are not restricting reproduction and that minimum habitat requirements have been met. Establishing a delisting criterion for shoreline raptors is also useful to demonstrate whether new contaminants become a problem for the AOC. Note, IBU 5: *bird or animal deformities or reproductive problems* was not originally identified for the Bay of Quinte so there were no delisting criteria to speak to this issue (which was affecting raptors) at the time of listing the Bay of Quinte as an AOC.

Data for this delisting criterion can be obtained through the Ontario Breeding Bird Atlas (OBBA), naturalist clubs or field surveys. At the time of publication, only preliminary results were available from the 2001-2005 OBBA and could not be used in this assessment. The 2001-2005 OBBA is scheduled for release in September 2006, at which time results can be used. Based on field observations by BQRAP staff, and discussions with local naturalists and birders, this delisting criterion should be considered 'not impaired'.

Bald eagles are also making a comeback in the Southern Great Lakes region due to reductions in chemical pollutants (e.g., DDT and PCBs) that impaired the reproductive success, and legislation that prevents the killing of bald eagles (Environment Canada, 2001). The presence of nesting bald eagles is not to be included as a delisting criterion, however, habitat studies for nesting bald eagles has been completed and the information is quite relevant in terms of habitat availability and quality. The Lake Ontario LaMP has recently commissioned a report entitled “Conserving Lake Ontario and Upper St. Lawrence River Bald Eagle Habitats” which identified two priority restoration sites in the Bay of Quinte AOC (Lake on the Mountain and the Murray Canal area) and a number of sites in the immediate area. Unfortunately, this study excluded most of the Bay of Quinte, so only sites close to Lake Ontario were identified. However, Quinte Conservation submitted an analysis using the same criteria and identified several sites that met some level of the screening procedure which included four phases, each phase getting more demanding in terms of habitat quality.
Support for these priority sites (through land securement, conservation agreements, nesting platforms, etc.) should be provided by the BQRAP and its partners as part of efforts to meet delisting criteria WP-3. Restoration of nesting bald eagles to the Bay of Quinte area would demonstrate a higher level of environmental quality than nesting osprey alone and in the process would secure habitat for other wildlife. Furthermore, because development pressure is increasing, the window of opportunity to secure high priority sites may be shrinking. However, given there are currently no nesting bald eagles on the shores of Lake Ontario, the presence of nesting bald eagles in the Bay of Quinte would not be a reasonable delisting criterion at this time.

WP-4 – Species at risk: Requires future assessment

The biodiversity of an ecosystem is a direct reflection of habitat quality and populations status. As part of restoring IBU 3, the BQRAP and its partners should take all reasonable efforts to promote the protection and restoration of species at risk in the AOC. Six wildlife species that rely upon healthy coastal wetland habitats in the Bay of Quinte have been designated as ‘at risk’ under the federal Species at Risk Act. Ensuring that all species at risk in the area are sustained and populations restored is not reasonable, since species at risk often face challenges beyond the Bay of Quinte and scope of the RAP. However, it was considered reasonable that applicable actions identified in national species at risk recovery plans should be acted upon within the AOC.

Federally-listed wildlife species at risk that rely upon wetland habitats in the Bay of Quinte include the following:

- King Rail (Rallus elegans), Endangered – Schedule 1
- Yellow Rail (Coturnicops noveboracensis), Special Concern – Schedule 1
- Least Bittern (Ixobrychus exilis), Threatened – Schedule 1
- Northern Map Turtle (Graptemys geographica), Special Concern – Schedule 1
- Stinkpot (Sternotherus odoratus), Threatened, Schedule 1
- Blanding’s Turtle (Emydoidea blandingii), Threatened, Schedule 1

Recovery plans are in various stages of development for these species. When completed, they should be reviewed for opportunities to implement actions that support the restoration of these species in the Bay of Quinte area. See Appendix III for a description of habitat issues facing these species at risk. In all possible efforts, where a recovery plan has identified critical habitat these areas shall be protected.
3.0 Focal areas and recommendations to meet delisting criteria

Ensuring IBUs 3 and 14 are restored and remain ‘unimpaired’ will require a strong regulatory framework, a scientific understanding of the status of impairments, public support for habitat initiatives and the completion of required habitat enhancement work to offset historical losses. No one component can successfully restore IBUs 3 and 14 – a comprehensive approach is required. Recommendations contained in this plan fall under the following four focal areas:

- Habitat management framework,
- Research and monitoring needs,
- Education and outreach, and
- Habitat protection and restoration.

Completion of recommendations contained in this report should be required before IBUs 3 and 14 can be considered restored.

Focal area 1: Habitat management framework

Successful wildlife management requires that there is enough habitat of sufficient quality to support ecosystem processes and wildlife communities. It also requires that wildlife harvest is managed carefully and that imperiled species are protected from harvest or disturbance. These are primarily the responsibilities of the OMNR and CWS and are carried out through enforcement of various pieces of legislation and creation of policies and regulations for municipalities, conservation authorities and individuals to comply. Conservation authorities also play a role in habitat/wildlife protection through administration of Ontario Regulation 97/04: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

Prevention of further and unacceptable habitat loss will primarily be accomplished through improvements to the planning process provincially and locally by the county and municipal governments. Development and economic growth can be accommodated while protecting water resources and natural spaces that are required to sustain a high quality of life and the natural capital on which economics relies. For example, utilizing brownfield sites (old industrial areas) and higher density housing options will reduce urban and industrial sprawl, which has been a significant cause of habitat loss. The Ontario government has been encouraging the redevelopment of brownfield sites by regulatory changes and financial incentive programs. Ongoing demand for large, countryside, estate housing and waterfront condominium development are serious issues regarding habitat loss and fragmentation and must be dealt with in the planning process. Developing NHRs at the county and municipal government levels will assist in identifying important landscape and ecological features so that development can be targeted to less sensitive areas. The NHRs are a precursor to Natural Heritage Strategy development. The reports must first be investigated and written based on sound science and practical guidelines but also they must be implemented and adopted into official plans by the necessary planning offices.
Recommendation 1.1 Complete Natural Heritage Reports (NHRs) for areas bordering the Bay of Quinte.

The BQRAP, in cooperation with the Corporation of the County of Prince Edward should develop a NHR for Prince Edward County (in particular those lands draining north to the Bay of Quinte).

Rationale:
In the Bay of Quinte area, the greatest threat to wildlife habitat and the populations it supports is the conversion of lands from natural or low impact development (e.g., mixed agricultural with green spaces) to more intensive forms of development (e.g., housing and condominium developments) that are largely incompatible with sustaining biodiversity and high quality habitats required for sensitive species.

There is a growing awareness at the provincial, regional and local level that planning decisions must take into consideration and protect the ‘Natural Heritage System’ of an area. The BQRAP 2001-2005 Work Plan identified the need to complete NHRs for all areas bordering the Bay of Quinte so that the Bay’s Natural Heritage System would be protected. NHRs have been completed for all areas adjacent to the north shore of the Bay of Quinte including Quinte West/Belleville/Trent Hills, Tyendinaga Mohawk Territory and the Town of Greater Napanee. A NHR has not been completed for Prince Edward County. However, the “How Much Habitat is Enough?” guidelines produced by Environment Canada for Great Lakes AOCs was applied, in 2006, to the portion of Prince Edward County that drains into the Bay of Quinte. This report identified several areas that stewardship initiatives may be targeted in efforts to establish vegetated buffers around streams, wetlands and lakes. As well it provided information on potential areas that could be targeted for enlarging forest blocks and decreasing habitat fragmentation.

Implementer: BQRAP and Prince Edward County.
Timeframe: immediate.

Focal area 2: Research and monitoring needs

The primary research and monitoring needs relate to the improvement and securement of MMP data. Proposed delisting criteria for IBU 3 (wildlife) are based upon MMP data. BSC is working with the CWS to refine the MMP analysis for AOCs, so that results more accurately reflect the status of marsh-dependent species. Improvements to the MMP analysis may require revision of wildlife population delisting criteria.

The second research and monitoring need relates to obtaining data. The MMP relies largely upon the efforts of volunteers. Securement and retention of volunteers in the Bay of Quinte area has proven difficult, despite annual efforts to recruit and train volunteers (e.g., community wildlife monitoring workshops) each spring. For delisting criteria to be assessed properly, data are required at representative coastal wetlands over a number of years.
Recommendation 2.1 Ensure wildlife and habitat monitoring is completed

BQRAP partners should commit to carry out the field work (paid staff) or hire contractors to survey the representative coastal wetlands identified in this report (see Appendix IV). In addition, BSC has initiated a MMP Ambassador Initiative whereby local MMP enthusiasts in working with MMP staff help deliver and coordinate volunteer activities in local communities. Initial results from this initiative look promising and the program may be useful to the BQRAP in efforts to attract and recruit MMP volunteers. The existing BQRAP Community Wildlife Monitoring Program should continue to assistant in the training and delivery of the MMP.

Rationale:
The MMP data provide standardized, defensible data for amphibians and marsh birds that is comparable between AOC and non-AOC areas. In conjunction with other delisting criteria and augmented CWS bird data, this information will allow the RAP to determine when IBUs 3 and 14 can be delisted. Committing to the collection of the necessary ongoing data is of paramount importance to the RAP process.

Recommendation type: Action based – supports delisting criterion FWH-6, WP-1 and WP-2. Implementer(s): BQRAP.
Potential partners: MMP volunteers, BSC, naturalist clubs, CWS, Environment Canada (Great Lakes Sustainability Fund), Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA), local conservation authorities.
Timeframe: begin sampling at representative locations in spring 2007 and continue until the BQRAP-AOC is in an area of recovery phase (and beyond).

Recommendation 2.2 Complete the coastal wetland monitoring in the Bay of Quinte following the Durham Region Coastal Wetland Monitoring Project (DRCWMP) framework

Funding and/or partnerships should be secured to complete coastal wetland monitoring using the DRCWMP framework at representative coastal wetlands (see Appendix IV). Imperative components of the protocol that should be sampled annually at each site include fish sampling, water quality and submerged aquatic vegetation. Refer to EC-CLOCA Handbook, 2007 (in press) for the sampling protocols.

Rationale:
This protocol will provide information necessary to understand the status of delisting criteria FWH-2 and FWH-3 and assist the delisting process for IBU 14.

Recommendation type: Action based – supports delisting criteria FWH-2 and FWH-3. Implementer: BQRAP.
Potential partners: Environment Canada (Great Lakes Sustainability Fund), CWS, Fisheries and Oceans Canada, Central Lake Ontario Conservation Authority (boat crew), Quinte Conservation, Lower Trent Conservation Authority.
Timeframe: begin sampling at representative locations in 2007 and continue until BQRAP-AOC is in an area of recovery phase (and beyond).

**Focal area 3: Education and outreach**

The majority of shoreline areas and coastal wetlands bordering the Bay of Quinte are privately owned. Increasingly, these areas are being sub-divided and development intensity increased. These areas are critical in terms of protecting wildlife habitat; therefore, public education and involvement must be considered one of the cornerstones of any long-term plan to protect and rehabilitate wildlife habitat. Improved public awareness also provides the impetus for improved public policy and government action, which is critical to long-term success.

Ongoing efforts by the BQRAP, Community Wildlife Monitoring Program and its conservation partners should continue to be supported, bringing awareness to the local community. Ongoing communications efforts that should be supported include: monthly bulletins for media outlets, radio advertisements and promotion of community wildlife monitoring programs. Innovative communications products and promotional materials should also be developed to promote the Area in Natural Recovery designation for the Bay of Quinte.

**Recommendation 3.1 Enhance communications with resource users and the public**

The BQRAP and its partners should enhance their communications efforts with the public. In addition to ongoing communications efforts carried out by the BQRAP and its partners, recommended actions include:

- Preparation of a fish and wildlife/tourism tabloid which promotes the view that a healthy Bay of Quinte means a strong and healthy local community and economy.
- Presentations to local stakeholders, municipal staff, schools, day camps, fish and game clubs, etc. to promote BQRAP objectives and secure support for habitat initiatives outlined in the Fish Habitat Management Plan and the Wildlife Related Impairments Management Plan.

Recommendation type: Institutional commitment – supports delisting criteria FWH-6 and FWH-5.
Implementer(s): BQRAP.
Potential partners: local conservation authorities, OMNR district offices and land stewardship committees, conservation groups.
Timeframe: ongoing.

**Focal area 4: Habitat protection and restoration**

Through the work of the BQRAP and its partners, progress has been made towards the restoration of wildlife habitat in the Bay of Quinte. Phosphorous levels and nuisance algae...
have been greatly reduced, aquatic plants are more widely distributed in the Bay and extensive tree planting and land stewardship practices have been promoted in the watershed. In this respect, existing fish and wildlife habitat in the Bay of Quinte may not warrant the label of 'impaired'. However, it must not be forgotten that there was also a considerable loss of fish and wildlife habitat and this is a significant part of IBU 14: loss of fish and wildlife habitat. Therefore, it is incumbent upon the BQRAP to promote and facilitate the rehabilitation of habitat and offset historical losses of habitat, where feasible.

Within a plan to protect and rehabilitate habitat, there must be a hierarchy of preferred approaches that guides where limited resources are allocated. The recommendations provided in Focal Area 4 should be considered with the following hierarchy for habitat protection and enhancement in mind:

1st - Protection of existing habitat is the best option.
2nd - Restoration of natural processes is preferred over artificial habitat manipulation.
3rd - Restoring access to natural habitat is preferred over habitat creation.
4th - Artificial creation of habitat is the least preferred option.

Protection of existing habitat may take the form of formal acquisition of lands bordering the Bay of Quinte or conservation easements or conservation agreements such as the Hastings-Prince Edward Land Trust through national conservation organizations such as the Nature Conservancy of Canada (NCC), Ducks Unlimited Canada (DUC) and/or local groups. Also individual land donations (e.g., Ecological Gifts Program) and purchase of property through various outlets is an additional source of land securement. Protection of habitat through these mechanisms is highly dependent upon opportunities that arise (e.g., landowner interest), so the plan has not focused on specific sites. However, securement should be encouraged as a mechanism to provide long-term protection of habitat. The Great Lakes Conservation Blueprint for Aquatic and Terrestrial Biodiversity, recently completed by NCC and the OMNR provides detailed maps identifying potential areas for protection (Wichert et al., 2005 and Henson et al., 2005). Several sites in the Bay of Quinte area were identified, providing some guidance on priorities. With this linkage to NHRs for the area, many priority sites can be examined in greater detail. While ownership of conservation lands is ideal, it is also quite expensive and in some cases unrealistic making private landowner stewardship a complementary priority.

Restoration of natural processes is an important issue for the Bay of Quinte. As discussed, water level regulation has impacted coastal wetland habitat and continues to be an ongoing issue. The International Joint Commission (IJC) has recently commissioned a study to explore options for water level management on Lake Ontario. The proposed options (particularly Option B+ Balanced Environmental) hold promise for restoring more natural water level fluctuations – although a return to a purely natural state will not occur. Initiatives such as this must be considered in the overall management scheme and selection of rehabilitation projects.
**Recommendation 4.1 – Shoreline naturalization program incorporating outreach, education and stewardship activities**

Develop and implement an outreach program that targets shoreline landowners on the Bay of Quinte and provides the funding and technical assistance to carry out shoreline naturalization projects.

Delisting criterion FWH-4 sets out an objective of 80 percent of the shorelines along the Bay of Quinte must have an undisturbed natural terrestrial vegetative buffer of 5-m or greater from the high water mark. From 5-m to 30-m (or 120-m for PSW) the extent of the buffer should be 60 percent naturally vegetated. The shoreline naturalization program will need to include an assessment mechanism to determine what level exists and when the objective has been reached.

Implementer(s): BQRAP.
Potential partners: Funding partners, local conservation authorities, conservation groups, landowners.
Timeframe: until delisting criterion is met.

**Recommendation 4.2 – BQRAP actively seek out potential land securement and/or conservation agreements with support from partner agencies**

The BQRAP, working in conjunction with Quinte Conservation, Lower Trent Conservation and its partners (e.g., Hastings-Prince Edward Land Trust) should develop a policy for the acquisition of land. As well they should develop a prioritized list of sites for acquisition or protection from development or conservation agreement that could be used to leverage funding or capitalize on funding opportunities/partnerships or donation opportunities as they arise.

Rationale:
The Bay of Quinte area is facing ongoing development pressure as people realize the opportunities and lifestyle that exist here. Securing and protecting through good planning enough land to preserve the ecological integrity and biodiversity of the area before all areas are developed must be accomplished relatively soon before the window of opportunity closes. This should be seen as a component of restoring IBU 14.

Setting a measurable delisting criterion on land acquisition or protection from development is not feasible, because opportunities for acquisition are sporadic and depend largely on funding and donations.

Sample properties and property types include:
- All lands adjacent to PSWs,
- All forested lands adjacent to the Bay of Quinte, particularly those greater than 640 acres, which is one of the criteria for bald eagle nesting sites,
- Any remaining beach areas (beach and dune habitat is extremely rare, since most has been developed as prime recreational land),
- Areas identified in the Belleville to Point Anne Strategic Plan (Hartley et al. 1997),
- Coastal areas identified in the Great Lakes Blueprint for Terrestrial and Aquatic Biodiversity (Henson et al. 2005 and Wichert et al. 2005), and
- Coastal areas identified in NHRs.

Recommendation type: Institutional commitment – supports delisting criterion FWH-6 and possibly WP-1 through WP-4 depending on site features.
Implementer: BQRAP.
Partners: local conservation authorities and conservation organizations such as NCC, Hastings-Prince Edward Land Trust, DUC.
Timeframe: ongoing.

Recommendation 4.3 – Maintenance of existing nesting platforms and establishment of additional nesting platforms for Bald Eagle and Osprey

(a) The BQRAP should work with its conservation partners to ensure that all osprey nesting platforms around the Bay of Quinte are maintained and have predator raccoon guards installed. Additional nesting platform sites should be encouraged where appropriate.

(b) The BQRAP should work with its conservation partners to ensure nesting platforms (in the absence of preferred natural nesting sites) have been erected at priority sites identified in the Lake Ontario LaMP “Conserving Lake Ontario and Upper St. Lawrence River Bald Eagle Habitats” (in press) or at sites identified in the Bay of Quinte using the same methodology (the Bay of Quinte was not included in the original analysis). Further, land securement activities should be promoted around priority sites for bald eagle restoration directly linking to recommendation 4.2.

Rationale:
Raccoons are natural predators of osprey eggs in some areas, and have even been known to swim out to osprey nests in shallow lakes and climb 15-m hydro poles to raid a nest (Environment Canada, 2005). Simple sheet metal predator guards installed near the base of the pole have been shown to effectively deter predators. Completing this work would also be an ideal educational opportunity for working with youth. Initially, nesting platforms were not installed with predator guards, so there will need to be an assessment of how many platforms are lacking the predator guards and then the installation on those that require protection.

Bald eagles require relatively undisturbed nesting sites with adequate forest cover surrounding the site, making them an excellent indicator of shoreline ecosystem health and biodiversity. Protecting their habitat will also benefit other species. As development pressure grows in the Bay of Quinte area, opportunities to secure habitat in support of these magnificent birds is shrinking. Although bald eagles are not currently nesting on Lake Ontario shorelines, the recent discovery of nesting bald eagles in Frontenac County (inland from Lake Ontario) indicates that bald eagles may be expanding their range and are active
in the area. Although bald eagles are not nesting on the Bay of Quinte, they have been sighted in the area.

Recommendation type: Action based – supports delisting criterion WP-3
Implementers: BQRAP.
Partners: funding partners, conservation organizations, BSC, Mohawks of the Bay of Quinte, OMNR, partners to install poles and guards, partners to maintain poles and securement/stewardship partners for the land.
Timeframe: immediate.

Recommendation 4.4 – Support species at risk recovery plans

The BQRAP, in conjunction with its conservation partners should support species at risk recovery plans for all species, where recovery plans identify conservation actions applicable to the Bay of Quinte AOC.

Rationale:
Species at risk are one indication of how well habitats are protecting biodiversity. Although it will not be possible to ensure the restoration of all species at risk due to influences beyond the scope of the RAP process, where reasonable actions are recommended to promote the protection and restoration of these species through an approved recovery plan or strategy, then the BQRAP should support and provide assistance where possible as part of restoring IBU 3: Degradation of fish and wildlife populations.

Implementers: BQRAP.
Partners: funding agencies, conservation organizations, Mohawks of the Bay of Quinte, CWS, and the OMNR.
Timeframe: upon completion of recovery plans.
4.0 References


http://www.on.ec.gc.ca/wildlife/factsheets/fs_osprey-e.html


### Appendix I: Examples of exotic invasive species within the Bay of Quinte watershed and surrounding areas (adapted from McNevin, 2005).

<table>
<thead>
<tr>
<th>Species</th>
<th>Negative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eurasian watermilfoil <em>(Myriophyllum spicatum)</em></td>
<td>Aquatic plant that forms dense mats of vegetation in wetland areas, blocking sunlight to native aquatic vegetation.</td>
</tr>
<tr>
<td>European frog-bit <em>(Hydrocharis morsus-ranae)</em></td>
<td>Aquatic plant that forms very dense mats, blocking sunlight to native vegetation thereby reducing native plant diversity.</td>
</tr>
<tr>
<td>Fanwort <em>(Cabomba caroliniana)</em></td>
<td>Aquatic plant that can crowd out native aquatic vegetation, clog drainage canals and when dense mats decay, can lower dissolved oxygen levels.</td>
</tr>
<tr>
<td>Purple loosestrife <em>(Lythrum salicaria)</em></td>
<td>Perennial shoreline plant that forms dense stands, displacing native shoreline vegetation (grasses, sedges, flowering plants) which provide better habitat and nutrition for wildlife.</td>
</tr>
<tr>
<td>Flowering rush <em>(Butomus umbellatus)</em></td>
<td>Perennial aquatic shoreline plant that can displace native shoreline vegetation such as bulrushes, willows and cattails because of its thick root system (<a href="http://www.invadingspecies.com">www.invadingspecies.com</a>)</td>
</tr>
<tr>
<td>Garlic mustard <em>(Alliaria petiolata)</em></td>
<td>Rapidly spreading woodland weed that dominates the woodland floor and displaces woodland wildflowers and native herbaceous species.</td>
</tr>
<tr>
<td>Common/European buckthorn <em>(Rhamnus cathartica)</em> and Glossy buckthorn <em>(R. frangula)</em></td>
<td>Shrub or small tree that forms dense stands that block out sunlight, replaces native vegetation and prevents the growth of native seedlings, resulting in decline in forest quality.</td>
</tr>
<tr>
<td>Asian long-horn beetle <em>(Anoplophora glabripennis)</em></td>
<td>Insect pest that attacks and can eventually kill healthy and stressed hardwood trees of all sizes.</td>
</tr>
<tr>
<td>Emerald ash borer <em>(Agrilus planipennis)</em></td>
<td>Insect pest native to Asia that lays its eggs in the trunk of ash trees. The young hatch, bore into the tree and feed on cambial layer, eventually killing the tree. Primarily found in Essex County (southwestern Ontario), but potential for spreading to the Quinte area.</td>
</tr>
<tr>
<td>Zebra mussels <em>(Dreissena polymorpha)</em></td>
<td>A small, non-native mussel originally found in Russia. The greatest direct impact relates to the mussel’s feeding behavior. Zebra mussels are filter feeders and process up to one gallon of water per day/mussel. During this process, every particle in the water column is removed and either eaten by the mussels or wrapped in mucus and spit out. This feeding ability, in combination with high population densities, rapidly clears the water of even the largest lakes. Unfortunately, the material removed from the water consists of other live animals and algae that supply food for larval fish and other invertebrates. In response to this changing food supply, populations of some animals have begun to decline.</td>
</tr>
<tr>
<td>Common Carp <em>(Cyprinus carpio)</em></td>
<td>Common Carp degrade shallow lakes by causing excessive turbidity, which can lead to declines in aquatic plants and important native fish species. The common carp was introduced by unintentional release in 1879. A potentially destructive exotic species especially with regards to degraded water quality and destruction of submerged aquatic vegetation in coastal wetlands</td>
</tr>
</tbody>
</table>
Appendix IIa: Conservation partners working in the Bay of Quinte watershed  
(Portions adapted from the Wildlife Backgrounder (McNevin, 2005)).

Conservation Authorities (CAs)

Conservation authorities bordering the Bay of Quinte (Lower Trent Conservation, Quinte Conservation and Cataraqui Region Conservation Authority) are empowered by the Conservation Authorities Act to undertake programs to further the conservation, restoration, development and management of natural resources on a watershed basis. Conservation Authorities support the protection and enhancement of wildlife habitat through the following functions:

- Administering Ontario Regulation 97/04: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses,
- Source Water Protection planning,
- Leadership and technical expertise regarding Remedial Action Plan deliverables,
- Assisting municipalities in Official Plan review,
- Technical and program assistance for the Greencover Canada program,
- Maintenance of Conservation Areas and strategic acquisition of natural habitats (approximately 45 properties in the Bay of Quinte watershed, totaling 50 ha (McNevin, 2005)),
- Educational programs for youth (e.g., day camps), and
- Provision of low cost seedlings for tree planting and tree planting advice.

Ontario Ministry of Natural Resources (OMNR)

The Ontario Ministry of Natural Resources is responsible for the protection and management of Ontario’s natural resources. Primarily, it oversees the administration and enforcement of the following pieces of legislation that affect wildlife and their habitat: Fish and Wildlife Conservation Act, Crown Forest Sustainability Act, Conservation Land Act, Endangered Species Act, Lakes and Rivers Improvement Act and the Public Lands Act. Other contributions that the OMNR makes to the protection and enhancement of wildlife habitat include:

- Operates the Natural Heritage Information Centre (NHIC) which “…compiles, maintains and provides information on rare, threatened and endangered species and spaces in Ontario” (NHIC website: http://nhic.mnr.gov.on.ca/nhic.cfm),
- Administers the Conservation Land Tax Incentive Program and Managed Forest Tax Incentive Program, which provides property tax incentives for private landowners to protect natural heritage features on their lands,
- Administers the Community Fish and Wildlife Involvement Program which provides financial assistance to local community groups,
- Provided technical advice and support to the RAP process,
- Administrates the Ontario Stewardship Program,
• Plays lead role in the evaluation of wetlands and advisor to Ontario Ministry of Municipal Affairs and Housing (OMMAH) on planning act, with respect to natural heritage policy statement, and
• Fish and wildlife enforcement.

Environment Canada (EC)

The Ontario Region of Environment Canada delivers national programs tailored to respond to regional and local issues; implements their Great Lakes Program. Part of Environment Canada’s role in the BQRAP is driven by the Canada-Ontario agreement within the Great Lakes Water Quality Agreement and reflected by the involvement of EC’s Restorations Program Division in the BQRAP Restoration Council.

EC’s CWS is also involved in the BQRAP Restoration Council’s Wildlife Steering Committee to support the efforts described above. In additional support, the CWS coordinates coastal wetland assessments across the Great Lakes Basin with special focus on Canadian Great Lakes AOCs. This work supports the RAP and helps deliver departmental goals related to federal legislation such as the Migratory Birds Convention Act, Canada Wildlife Act, and Species at Risk Act.

Environment Canada also administers the Ecological Gifts Program (EGP) which aims to protect Canada’s biodiversity and environmental heritage through income tax incentives for donors of land. To date, over 420 ecogifts valued at over $111 million have been donated across Canada, protecting 35,000 ha of wildlife habitat. More than one-third of these ecogifts contain areas designated as being of national or provincial significance, and many are home to some of Canada’s species at risk.

Environment Canada’s Habitat Stewardship Program (HSP) for Species at Risk also provides another avenue for potentially implementing activities that protect and conserve species at risk within the Bay of Quinte AOC. The overall goal of the HSP is to contribute to the recovery of endangered, threatened, and other species at risk, and to prevent other species from becoming a conservation concern, by engaging Canadians from all walks of life in conservation actions to benefit wildlife.

Ducks Unlimited Canada (DUC)

Ducks Unlimited Canada contributes substantially to the protection and enhancement of wildlife habitat in the Bay of Quinte area by establishing conservation agreements with landowners, enhancing habitat (e.g., tree planting, establishing buffer areas around wetlands, etc), educating the public through outreach and influencing policy. Their ongoing efforts in the Bay of Quinte watershed and beyond contribute directly to BQRAP fish and wildlife objectives.

Wetland Habitat Fund (WWF)

By providing direct funding assistance to landowners to carry out habitat enhancement projects, the Wetland Habitat Fund continues to implement on-the-ground projects each year, directly contributing to the restoration of IBUs 3 and 14.
Ontario Woodlot Association
The Ontario Woodlot Association is a non-profit organization that promotes sustainable forestry practices in Ontario’s private forests. With over 1,000 woodlot owners, the association has been able to educate and work towards sustaining over 10,000 properties of approximately $7,336 \text{ km}^2$ (733,650 ha) throughout Ontario.

Ontario Land Trust Alliance (OLTA)
Ontario Land Trust Alliance members work at the local, regional or provincial level to secure the natural attributes of the landscape through acquisition or establishment of conservation easements for the purpose of conservation. The hallmark of a land trust is the direct action they take to protect the local land base, and that they hold those lands or conservation easements in trust for future generations (Ontario Land Trust Alliance August 2006, [www.ontariolandtrustalliance.org](http://www.ontariolandtrustalliance.org)). In the Bay of Quinte, the local land trust and OLTA member is Hastings-Prince Edward Land Trust. The Land Conservatory of Kingston, Frontenac, Lennox and Addington are also active nearby.

Ontario Stewardship
Based in the southern part of the province, Ontario Stewardship is a program of the OMNR, and answers the question, "What positive role can agencies play in influencing the land management practices of private landowners?" In today’s era of financial constraints, partnerships and self-regulation, Ontario Stewardship seeks to link landowners with funding, information and expertise to ensure that good management practices flourish.

Throughout Ontario, 40 community stewardship councils exist that are represented by community volunteer groups including landowners and land interest groups. The members of the council determine the environmental priorities for their area. The council recommends and acts on several stewardship projects, such as: landowner workshops on woodlot and wetland management, pamphlets and extension notes, stream restoration projects, endangered species conservation, environmental school programs, demonstration projects, community tree plantings, etc. Additional information can be found on the Ontario Stewardship website ([www.ontariostewardship.org](http://www.ontariostewardship.org)).

The Nature Conservancy of Canada (NCC)
For over 40 years, the NCC has been working to protect Canada’s most threatened natural habitats and the endangered species that call them home. NCC is a national charity dedicated to preserving ecologically significant areas through outright purchase, donations and conservation easements. Their plan of action is partnership building and creative deal-making with any individual, corporation, community group, conservation group or government body that shares their passion. Since 1962 they have secured a long-term future for more than 1,400 properties, comprising 1.8 million acres of magnificent woodlands and seashores, internationally significant wetlands, threatened prairies, and a host of other precious natural places. And in the process, they have won the confidence of Canadians who want to protect their natural heritage for generations to come (Nature Conservancy of Canada, 2005, [www.natureconservancy.ca](http://www.natureconservancy.ca)).
### Appendix IIb. Summary of selected habitat initiatives within the Bay of Quinte Watershed (adapted from McNevin, 2005)

<table>
<thead>
<tr>
<th>Lead organization</th>
<th>Program/Project</th>
<th># of sites</th>
<th>Area affected (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bay of Quinte Remedial Action Plan</strong></td>
<td>Habitat Enhancement Program&lt;br&gt;Rural Water Quality Program&lt;br&gt;Outreach Programs (tree planting, voluntary conservation agreements)</td>
<td>~200&lt;br&gt;~400</td>
<td>1,100&lt;br&gt;unknown</td>
</tr>
<tr>
<td><strong>Conservation Authorities</strong></td>
<td>Conservation Areas and managed lands</td>
<td>45</td>
<td>20,235</td>
</tr>
<tr>
<td><strong>Ducks Unlimited Canada</strong></td>
<td>Various – livestock fencing, wetland creation and management, strategic land acquisition and conservation agreements</td>
<td>178</td>
<td>152,076</td>
</tr>
<tr>
<td><strong>Environment Canada</strong></td>
<td>Ecological Gifts Program</td>
<td>11</td>
<td>708</td>
</tr>
<tr>
<td><strong>Ontario Land Trust Alliance</strong></td>
<td>Hastings-Prince Edward Land Trust&lt;br&gt;Land Conservancy of Kingston, Frontenac, Lennox and Addington</td>
<td>?&lt;br&gt;?</td>
<td>41&lt;br&gt;65</td>
</tr>
<tr>
<td><strong>OMNR</strong></td>
<td>Areas of Natural and Scientific Interest (ANSIs)&lt;br&gt;Provincially Significant Wetlands (PSWs)</td>
<td></td>
<td>69,191&lt;br&gt;87,156</td>
</tr>
<tr>
<td><strong>OMNR</strong></td>
<td>Ontario Stewardship Program – improvements to land management, tree planting, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OMNR</strong></td>
<td>Community Fish and Wildlife Involvement Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OMMR: Provincial Parks</strong></td>
<td></td>
<td></td>
<td>22,888</td>
</tr>
<tr>
<td><strong>Ontario Woodlot Association</strong></td>
<td>Adoption of a ‘Code of Practice’ by woodlot owners to allow forest extraction while minimizing environmental impacts</td>
<td>2890</td>
<td>2,063,000</td>
</tr>
<tr>
<td><strong>Ontario Nature</strong></td>
<td>Nature Reserves Program: Altberg Wildlife Sanctuary</td>
<td></td>
<td>470</td>
</tr>
<tr>
<td><strong>Wetland Habitat Fund</strong></td>
<td>Livestock fencing, tree planting, nesting structures, etc</td>
<td>&gt; 50</td>
<td>200</td>
</tr>
</tbody>
</table>

**Note:**
1) Lands identified as “affected” vary in their level of protection from outright securement and protection to improved management practices.
2) Lands are throughout the Bay of Quinte watershed not just in the coastal areas prioritized in this report.
### Appendix III: Federally-listed species at risk within the Bay of Quinte Area of Concern, with emphasis on coastal wetland species

<table>
<thead>
<tr>
<th>Species</th>
<th>Habitat issues summarized from SAR website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least Bittern  <em>Ixobrychus exilis</em> - Threatened (Schedule 1)</td>
<td>Loss of habitat due to development, drainage of wetlands and natural filling in of wetlands by woody vegetation. Human disturbance during the nesting period is another important limiting factor. For example, recreational boats and jet skis create high waves and noise which can adversely affect reproductive success. Since Least Bitterns are partially nocturnal and tend to fly very low, they are sometimes killed by cars or by collisions with hydropower lines, lighthouses, buildings, etc. National Recovery Strategy for the Least Bittern – recovery team/plan being developed.</td>
</tr>
<tr>
<td>Yellow Rail  <em>Coturnicops noveboracensis</em> - Special concern (Schedule 1)</td>
<td>The loss and degradation of wetlands due to agricultural and human development is the greatest threat to this species throughout its breeding range. On the wintering grounds, habitat loss has been so extensive that the wintering range may no longer be contiguous, and the rails are becoming largely restricted to a narrow band of coastline. Coastal marshes are threatened throughout the Gulf states. Recovery Strategy – none listed.</td>
</tr>
<tr>
<td>Northern Map Turtle  <em>Graptemys geographica</em> - Special concern (Schedule 1)</td>
<td>Loss of habitat and use of waterways for recreation are perhaps the greatest significant threats to this species. The control of water levels, particularly with dams, may adversely affect the turtles by submerging nesting sites and altering habitat. The diet of the Northern Map Turtle makes it vulnerable to accumulation of heavy metals and other toxins. Wildlife trade (for food or as pets) is an additional threat to this turtle, which resembles other highly desirable species. Recovery strategies are at various stages of completion for the following areas: Walpole Island, Ausable River, Thames River and Quebec.</td>
</tr>
<tr>
<td>Stinkpot  <em>Sternotherus odoratus</em> - Threatened (Schedule 1)</td>
<td>Turtle whose primary threat is habitat destruction, wetland infilling, shoreline development. Also vulnerable to drought and high water levels after egg laying. Recovery strategies are at various stages of completion for the following areas: Walpole Island, Thames River and Quebec.</td>
</tr>
<tr>
<td>Blanding’s Turtle  <em>Emydoidea blandingii</em> – Threatened (Schedule 1)</td>
<td>Turtle whose primary threat is habitat destruction, wetland infilling, shoreline development. Also vulnerable to drought and high water levels after egg laying. Recovery strategies are at various stages of completion for the following areas: National Recovery Strategy for the Walpole Island Ecosystem, and the Quebec Recovery Plan for five turtle species.</td>
</tr>
</tbody>
</table>
Appendix IV: Suggested representative coastal wetlands for monitoring in the Bay of Quinte Area of Concern.

<table>
<thead>
<tr>
<th>Wetland name</th>
<th>MMP¹</th>
<th>DRCWMP²</th>
<th>Disturbance factor³</th>
<th>Size</th>
<th>Characteristics⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>High</td>
<td>Medium &lt;100 ha</td>
</tr>
<tr>
<td>1. Big Island Marsh</td>
<td>Yes</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>858</td>
</tr>
<tr>
<td>2. Blessington Creek</td>
<td>Yes</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>112</td>
</tr>
<tr>
<td>3. Carrying Place</td>
<td>No</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>62</td>
</tr>
<tr>
<td>4. Carnachan Bay</td>
<td>No</td>
<td>No</td>
<td>?</td>
<td></td>
<td>71</td>
</tr>
<tr>
<td>5. Dead Creek</td>
<td>No</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>359</td>
</tr>
<tr>
<td>6. Hay Bay</td>
<td>No</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>1333</td>
</tr>
<tr>
<td>7. Lower Napanee River</td>
<td>No</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>206</td>
</tr>
<tr>
<td>8. Lower Sucker Creek</td>
<td>No</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>76</td>
</tr>
<tr>
<td>9. Sawguin Creek Marsh</td>
<td>Yes</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>2093</td>
</tr>
<tr>
<td>10. Solmesville Marsh</td>
<td>No</td>
<td>Yes</td>
<td>X</td>
<td></td>
<td>28</td>
</tr>
</tbody>
</table>

Notes:
1. MMP = Marsh Monitoring Program volunteer data (number of years surveyed varies by wetland).
2. DRCWMP = Durham Region Coastal Wetland Monitoring Project data (mostly 2003, 2005 and 2006 data). Note, an indication of “yes” does not necessarily mean that all aspects of the protocol were employed (i.e., electrofishing or amphibian surveys may not have been completed).
3. Disturbance factor is a subjective term based on field observations within one kilometre of wetland.
4. Characteristics: – where a wetland had a significant riverine component, it was considered riverine.