



Aquatic Fish and Wildlife Habitat Management Tier 2 Worksheet



Community Environmental Management

Acknowledgements

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We also would like to thank our County Soil and Water Conservation District colleagues _____ and _____ for their review and comments.

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Overview

Aquatic fish and wildlife habitat encompasses many different types of natural features, including stream and river corridors, wetlands, lakes, ponds and reservoirs. Aquatic habitat is not only important to the fish and wildlife that inhabit them, but also to the people around them. The health of this habitat has a real impact on the quality of life, recreational value, and economic benefits in your community. As a result, it is important to maintain necessary habitats in order to maintain individual species, ecosystems, and biodiversity.

In the past century, we have seen a decline in the amount and quality of fish and wildlife habitat. Land use changes are limiting the area available to support populations of species. Human population growth has increased the demand for open, forested or agricultural land to be converted to residential, commercial and industrial uses. As a result, fish and wildlife populations inhabiting these areas have had to move, adapt to the changes, or die out. The lack of understanding of ecosystem function, poor planning, and general indifference have allowed the demand for land use changes to jeopardize this resource.

The Clean Water Act (CWA) (in various sections) directs us to "...restore and maintain the chemical, physical, and biological integrity of our nation's waters," and "to provide for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." In the recent past, we have seen many management plans and practices developed to curb water quality impacts. Too often, those plans and practices focused on the chemical integrity of water, and not the physical (habitat) and biological integrity. Looking at resources in a more holistic manner allows integration of the physical and biological quality of water resources. Management plans and practices need to look at the core issue, not symptoms. For example, a stream in your municipality may have problems with bank erosion. Every so often, your highway department is charged with going in and dumping a load of stone to rip-rap the stream bank to get it stable. The rip-rap does not solve the bank erosion problem, but rather puts a band aid on a symptom. The sediment problem may stem from loss of riparian vegetation in the Town upstream, or increased stormwater runoff from a new development nearby. Resolving the core issue by restoring native riparian vegetation in the Town upstream, or managing the runoff before it reaches the stream is what's needed.

It is also important for municipalities to monitor and assess planning, protection, and restoration actions. Too often we make the mistake of doing something on the ground that looks good on paper and then never following through to learn what works, and what doesn't work. Strategies should be implemented holistically on a landscape scale, across political boundaries, if possible. The CEM Assessment process helps you examine not only what is going on in your community, but also in other communities around you that may have an impact on your resources. CEM encourages communities to work together on these issues whenever possible, because fish and wildlife do not recognize intermunicipal borders.

The biggest piece of the habitat management puzzle is the individual people living, working or recreating in your community. People are directly linked to and are a part of the natural environment. There needs to be a shift from emphasizing resource management to educating

people how their actions have a direct impact on the world around them. Simple backyard conservation techniques can enhance and protect aquatic fish and wildlife habitat. Many times, these techniques can save the homeowner money and increase their property values, but they need to be made aware of them in order to reap the benefits.

In New York State, local governments through their planning and regulatory functions, have the principle responsibility for controlling development activities. This role carries with it the responsibility for ensuring that development activities are undertaken with public health and safety of future inhabitants in mind, and in a manner that is compatible with the protection and enhancement of natural resources, including aquatic fish and wildlife habitat.

The purpose of this worksheet is to assess the nature of habitat loss and degradation in your community and to evaluate the capacity your community has to remediate degraded or lost habitat and to prevent further loss or degradation. The following is intended to provide insight into the evolving subject of aquatic fish and wildlife habitat management.

Summary of Aquatic Fish and Wildlife Habitat Management Practices

The New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources has developed a framework to address aquatic fish and wildlife habitat issues that integrates planning and implementation to form a cohesive and effective unit. It can be used to address these issues across the landscape using the policy and decision making process. Habitat management is a complex issue, with many factors contributing to the problem. The following framework outlines the main strategies and management options you can use to minimize impacts to aquatic fish and wildlife habitat in your community:

1. Protect Stream and River Corridors

These management options are both structural and nonstructural measures. They aim to protect the structural integrity of the corridor as well as the quality of the habitat. It applies to a wide variety of audiences from homeowners to policymakers.

2. Restore Stream and River Corridors

These management options are both structural and nonstructural measures that serve to mitigate problems that already exist, as well as prevent new problems in the future.

3. Protect Lakes, Ponds and Reservoirs

These management measures are largely for homeowners living near these bodies of water. By modifying how they use their land, they can protect aquatic fish and wildlife habitat as well as their property value.

4. Restore Lakes, Ponds and Reservoirs

These are mainly structural measures that can be taken to mitigate problems that already exist, as well as prevent new problems in the future.

5. Protect Wetlands

Wetlands are sponges that in a natural state absorb excess water volume, and filter out pollutants. With increased development, a greater volume of water and pollutants needs to be absorbed and filtered. Unfortunately, with this development usually comes a loss of wetlands and their functionality. This strategy uses education and policy to protect this valuable resource.

6. Restore Wetlands

These are mainly structural measures that can be taken to mitigate problems that already exist, as well as prevent new problems in the future.

How this Worksheet Can Assist your Community in Protecting Aquatic Fish and Wildlife Habitat

This worksheet can be used to help your community to:

1. More fully understand aquatic fish and wildlife habitat management concepts,
2. Assess where your community stands relative to education and land use laws that provide for the protection of aquatic fish and wildlife habitat.
3. Identify aquatic fish and wildlife habitat management needs, and
4. Begin to map out an aquatic fish and wildlife habitat management strategy for the future.

For help in filling out this worksheet and technical assistance on aquatic fish and wildlife habitat, it is recommended that you contact your County Soil and Water Conservation District, New York State Department of Environmental Conservation Regional Office or your area's United States Department of Agriculture Natural Resources Conservation Service Conservationist. Most communities do not have an aquatic fish and wildlife habitat management plan. This worksheet can help your community determine its aquatic fish and wildlife habitat management needs.

Technical references available for communities in New York State to learn more about aquatic fish and wildlife habitat are listed below.

- The New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources includes:

Bureaus

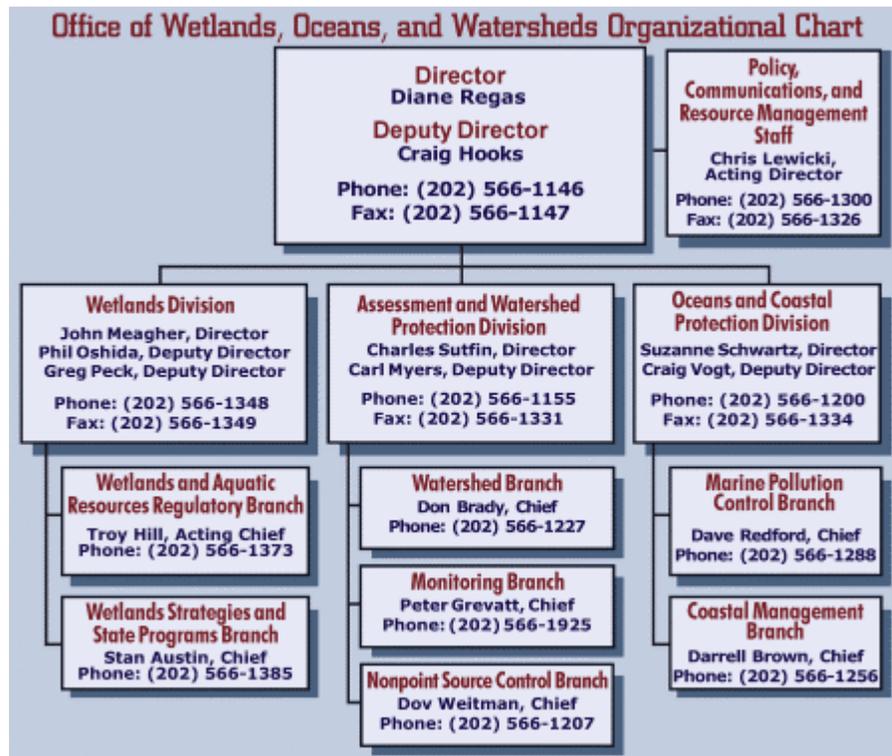
- Fish and Wildlife Services
- Fisheries
- Habitat
- Marine Resources and
- Wildlife

Division Programs

- Hudson River Estuary Program
- Hudson River National Estuarine Research Reserve
- New York Natural Heritage Program

They are in the process of incorporating and emphasizing a holistic, landscape scale program to deliver Division efforts. They strive to work with other Divisions within the Department of Environmental Conservation as well as other agencies, non-governmental agencies and partners to protect, maintain and restore fish and wildlife habitat across New York State. They look beyond political boundaries to deliver their programs on a landscape scale, such as basins and ecoregions across the State. Their web site can be found at: <http://www.dec.state.ny.us/website/dfwmr/index.html>, or by contacting the New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, 625 Broadway, Fifth Floor, Albany, NY 12233-4756, Phone: (518) 402-8151

- The New York Natural Heritage Program maintains databases on the known and potential locations of rare plants and animals, including those listed by New York State as endangered or threatened, and of significant habitats and vegetation types. For a list of those plants, animals, and habitats which are documented for your assessment area in the Natural Heritage Program's databases, please contact the Information Resources Coordinator, NY Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.
- The United States Environmental Protection Agency's Office of Wetlands, Oceans and Watersheds has a great deal of information available on a variety of wetlands protection issues. Their wetlands information can be found on the web at: <http://www.epa.gov/owow/wetlands/>, or by telephone according to the directory below.



*Taken from the Environmental Protection Agency's Office of Wetlands, Oceans and Watersheds at <http://www.epa.gov/owow/org.html>



Community Environmental Management

- Aquatic Fish And Wildlife Habitat Management Tier II Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to improve their ability to manage aquatic fish and wildlife habitat and minimize damage to it. The more factors that apply to your Assessment Area, the less likely you are to have adverse habitat impacts. Please check all of those you feel you are doing in your community.

Please check all that pertain to your community:

- We are protecting stream and river corridors
 - Maintain undisturbed riparian buffers
 - Establish stream and river setbacks
 - Develop, implement and enforce floodplain management land use regulations
 - Implement stormwater management practices
 - Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing)
 - Maintain thermal regime¹ (includes limiting damming and stormwater discharges, and maintain shading)
 - Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.)
 - Maintain balanced sediment budget
 - Identify and protect rare, endangered and threatened aquatic species
 - Maintain natural channel form (e.g. limit gravel mining and hardened banks)
 - Develop a strategy for eliminating exotic species and preventing them from displacing native species
 - Ensure stream/river crossings (bridges/culverts) do not impede fish movement and downstream transport of sediment
- We are restoring stream and river corridors
 - Replace/install native buffers, including trees
 - Restore natural stream form
 - Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and downstream transport of sediment)
 - Implement floodplain management practices
 - Implement stormwater management practices
 - Restore water budget
 - Restore in-stream habitat
 - Reduce excess sediment loads
 - Eliminate or control exotic species

¹ Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

- We are protecting lakes, ponds and reservoirs
 - Prevent nutrient enrichment from onsite waste treatment systems (e.g. septics) and agricultural runoff
 - Prevent sediments and toxics (e.g. fertilizers, pesticides, oil) from entering stormwater
 - Maintain littoral (near shore) habitat and associated native aquatic vegetation
 - Maintain the riparian area/shoreline
 - Maintain water budget (e.g. no winter drawdown²)
 - Develop a strategy for eliminating exotic species and preventing them from displacing native species
 - Minimize overwater structures (e.g. docks)
- We are restoring lakes, ponds and reservoirs
 - Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns
 - Restore streams flowing into lakes, ponds and reservoirs
 - Soften shorelines (e.g. where possible use native vegetation for streambank stabilization rather than stone, concrete, or sheet piling)
 - Restore natural water budget (e.g. eliminate winter drawdown for vegetative control)
 - Eliminate or control exotic species
 - Re-establish natural native aquatic vegetation (e.g. reduce aquatic weed control)
 - Establish shoreline buffers
- We are protecting wetlands
 - Develop, implement and enforce buffer regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools)
 - Maintain wetland buffers
 - Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands
 - Establish and implement a wetland education program
 - Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes
 - Develop and make available a system for reporting wetlands violations
 - Maintain natural hydrology (no flooding, excavating or draining)
 - Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do not overload their filtering capacity)
 - Develop a strategy for eliminating exotic species and preventing them from displacing native species
 - Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands)
 - Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review³
 - Maintain vegetative structure and the associated ecological community
- We are restoring wetlands
 - Restore natural hydrology by plugging ditches and restoring flows
 - Restore native vegetation
 - Remove fill
 - Remove exotic species
 - Establish and maintain buffers
 - Eliminate runoff, nutrients, toxics and sediments
 - Manage stormwater flows
 - Reestablish connectivity

² Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.

³ A wetland map is not a substitute for a site visit.



Community Problem & Needs Assessment

Part 2 of this assessment will help to determine how extensive **aquatic fish and wildlife habitat management issues** are in your community and what your community's capacity is for addressing them.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>Loss of aquatic habitat in streams and rivers <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Do you have any knowledge of: <input type="checkbox"/> Loss of spawning areas <input type="checkbox"/> Loss of feeding and growth habitat <input type="checkbox"/> Loss of resting and shelter area <input type="checkbox"/> Loss of winter habitat</p> <p>Locations (List): _____ _____</p>	<ol style="list-style-type: none"> 1. Removal of gravel from streams (private and commercial). 2. Increased sedimentation and erosion from stormwater, agriculture, road sanding, construction site runoff and cleaning roadside ditches. 3. Altered water flow from barriers, water withdrawal, stormwater, and floodplain alteration. 4. Loss of streamside buffers. 5. Loss of in-stream habitat (e.g. snagging, bulldozing, hardened banks, armoring of stream/river bed). 6. Competition from exotic species. 	<p>Check those impacts that apply:</p> <p><input type="checkbox"/> Loss of species</p> <p><input type="checkbox"/> Decline in populations</p> <p><input type="checkbox"/> Disease</p> <p><input type="checkbox"/> Decrease in biological diversity</p> <p><input type="checkbox"/> Change in community composition</p>	<p>Strategy: Protect Stream and River Corridors</p> <hr/> <p>Strategy: Restore Stream and River Corridors</p>

<p align="center">Management Options (Indicate with a "✓" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs⁴</p>
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Maintain undisturbed riparian buffers <input type="checkbox"/> Establish stream and river setbacks <input type="checkbox"/> Develop, implement and enforce floodplain management land use regulations <input type="checkbox"/> Implement stormwater management practices <input type="checkbox"/> Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing) <input type="checkbox"/> Maintain thermal regime⁵ (includes limiting damming and stormwater discharges, and maintain shading) <input type="checkbox"/> Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.) <input type="checkbox"/> Maintain balanced sediment budget <input type="checkbox"/> Identify and protect rare, endangered and threatened aquatic species <input type="checkbox"/> Maintain natural channel form (e.g. limit gravel mining and hardened banks) <input type="checkbox"/> Ensure stream/river crossings (bridges/culverts) do not impede fish movement and downstream transport of sediment <input type="checkbox"/> Develop a strategy for eliminating exotic species and preventing them from displacing native species 		
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Replace/install native buffers, including trees <input type="checkbox"/> Restore natural stream form <input type="checkbox"/> Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and sediment transport) <input type="checkbox"/> Implement floodplain management practices <input type="checkbox"/> Implement stormwater management practices <input type="checkbox"/> Restore water budget <input type="checkbox"/> Restore in-stream habitat <input type="checkbox"/> Reduce excess sediment loads <input type="checkbox"/> Eliminate or control exotic species 		
<p align="center">We suggest you also complete the Mining Worksheet to further assess impacts on your community.</p>		
<p align="center">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		
<p align="center">We suggest you also complete the Flooding Management Worksheet to further assess impacts on your community.</p>		

⁴ List type of assistance needed: information/education; assessment/planning; BMP design/implementation; regulatory options; project funding; etc.

⁵ Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>There are barriers to migration for fish and other organisms in streams and rivers ___ Yes ___ No</p>	<p>1. Dams, weirs, bridges, barriers and small/improperly installed culverts serve as in-stream barriers.</p> <p>2. Altered water flow from barriers, water withdrawal, stormwater, and floodplain alteration.</p>	<p>Check those impacts that apply:</p> <p>___ Loss of species</p> <p>___ Decline in populations</p> <p>___ Disease</p> <p>___ Decrease in biological diversity</p> <p>___ Change in community composition</p>	<p>Strategy: Protect Stream and River Corridors</p> <hr/> <p>Strategy: Restore Stream and River Corridors</p>

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> — Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing) — Maintain natural channel form (e.g. no gravel mining or hardened banks) 		
<p>Options:</p> <ul style="list-style-type: none"> — Restore natural stream form — Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and sediment transport) — Implement floodplain management practices — Restore water budget — Restore in-stream habitat 		
<p align="center">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		
<p align="center">We suggest you also complete the Flooding Management Worksheet to further assess impacts on your community.</p>		

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>Degraded stream/river health (e.g. diminished capacity to sustain/support aquatic species) ___ Yes ___ No</p> <p>Locations (List): _____ _____</p>	<p>1. Increased erosion and loading of sediment, toxics and nutrients from stormwater, agriculture, road sanding, construction site runoff and cleaning roadside ditches.</p> <p>2. Increased water temperature.</p> <p>3. Altered water flow from barriers, water withdrawal, stormwater, and floodplain alteration.</p>	<p>Check those impacts that apply:</p> <p>___ Loss of species</p> <p>___ Decline in populations</p> <p>___ Disease</p> <p>___ Fish kills</p> <p>___ Decrease in biological diversity</p> <p>___ Change in community composition</p>	<p>Strategy: Protect Stream and River Corridors</p> <hr/> <p>Strategy: Restore Stream and River Corridors</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Maintain undisturbed riparian buffers <input type="checkbox"/> Establish stream and river setbacks <input type="checkbox"/> Develop, implement and enforce floodplain management land use regulations <input type="checkbox"/> Implement stormwater management practices <input type="checkbox"/> Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing) <input type="checkbox"/> Maintain thermal regime⁶ (includes limiting damming and stormwater discharges, and maintain shading) <input type="checkbox"/> Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.) <input type="checkbox"/> Maintain balanced sediment budget <input type="checkbox"/> Identify and protect rare, endangered and threatened aquatic species <input type="checkbox"/> Maintain natural channel form (e.g. no gravel mining or hardened banks) 		
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Replace/install native buffers, including trees <input type="checkbox"/> Restore natural stream form <input type="checkbox"/> Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and sediment transport) <input type="checkbox"/> Implement floodplain management practices <input type="checkbox"/> Implement stormwater management practices <input type="checkbox"/> Restore water budget <input type="checkbox"/> Restore in-stream habitat <input type="checkbox"/> Reduce excess sediment loads 		
<p style="text-align: center;">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		
<p style="text-align: center;">We suggest you also complete the Flooding Management Worksheet to further assess impacts on your community.</p>		

⁶ Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>Loss of aquatic habitat in lakes, ponds and reservoirs ___ Yes ___ No</p> <p>Do you have any knowledge of: ___ Cleaning away habitat including logs ___ Water depth – draw down, narrowing near shore habitat ___ Exotics crowding out native species ___ Loss of near shore habitat ___ Loss of deep water habitat due to sedimentation</p> <p>Locations (List): _____ _____</p>	<ol style="list-style-type: none"> 1. Construction of docks, piers and boathouses. 2. Aquatic vegetation control. 3. Water level management. 4. Increased sedimentation and erosion from stormwater, agriculture, road sanding, construction site runoff and inflowing streams. 5. Import of exotic species which displace native species. 6. Filling of near and deep shore habitat. 7. Bulkheads displace your near shore habitat. 	<p>Check those impacts that apply:</p> <p>___ Loss of species</p> <p>___ Decline in populations</p> <p>___ Disease</p> <p>___ Decrease in biological diversity</p> <p>___ Change in community composition</p>	<p>Strategy: Protect Lakes, Ponds and Reservoirs</p> <hr/> <p>Strategy: Restore Lakes, Ponds and Reservoirs</p>

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> ___ Prevent sediments and toxics (e.g. fertilizers, pesticides, oil) from entering stormwater ___ Maintain littoral (near shore) habitat and associated native aquatic vegetation ___ Maintain the riparian area/shoreline ___ Maintain water budget (e.g. no winter drawdown⁷) ___ Develop a strategy for eliminating exotic species and preventing them from displacing native species ___ Minimize overwater structures (e.g. docks) 		
<p>Options:</p> <ul style="list-style-type: none"> ___ Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns ___ Restore streams flowing into lakes, ponds and reservoirs ___ Soften shorelines (e.g. where possible use native vegetation for streambank stabilization rather than stone, concrete, or sheet piling) ___ Restore natural water budget (e.g. eliminate winter drawdown for vegetative control) ___ Eliminate or control exotic species ___ Re-establish natural native aquatic vegetation (e.g. reduce aquatic weed control) ___ Establish shoreline buffers 		
<p align="center">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		

⁷ Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>Degraded lake, pond, or reservoir health <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Algae blooms and excessive weed growth</p> <p><input type="checkbox"/> Toxics</p> <p>Locations (List): _____ _____</p>	<p>1. On site septic systems failing because of soils, density/age of systems, and lack of maintenance.⁸</p> <p>2. Increased loading of toxics and nutrients from stormwater, agriculture, roads, inflowing streams and lawns.</p>	<p>Check those impacts that apply:</p> <p><input type="checkbox"/> Loss of species</p> <p><input type="checkbox"/> Decreased populations</p> <p><input type="checkbox"/> Decline in biological diversity</p> <p><input type="checkbox"/> Change in community composition</p> <p><input type="checkbox"/> Disease</p> <p><input type="checkbox"/> Fish kills</p>	<p>Strategy: Protect Lakes, Ponds and Reservoirs</p> <hr/> <p>Strategy: Restore Lakes, Ponds and Reservoirs</p>

⁸ Even septic systems that appear to be functional need to be pumped out approximately every five years to avoid getting solids in the leach field.

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> ___ Prevent nutrient enrichment from onsite waste treatment systems (e.g. septics) and agricultural runoff ___ Prevent toxics (e.g. fertilizers, pesticides, oil) from entering stormwater ___ Maintain water budget (e.g. no winter drawdown⁹) 		
<p>Options:</p> <ul style="list-style-type: none"> ___ Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns ___ Establish shoreline buffers 		
<p align="center">We suggest you also complete the Onsite Waste Treatment System Management Worksheet to further assess impacts on your community.</p>		
<p align="center">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		

⁹ Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>Loss and degradation of wetland and vernal pool habitat ___ Yes ___ No</p>	<p>1. Filling for development.</p> <p>2. Increased sedimentation from stormwater, agriculture, road sanding, construction site runoff and inflowing streams.</p> <p>3. Drainage for agricultural, commercial and residential purposes.</p> <p>4. Mosquito control.</p> <p>5. Fragmentation or loss of connectivity.</p>	<p>Check those impacts that apply:</p> <p>___ Decreased biological productivity in the food web</p> <p>___ Loss of natural nutrient cycling</p> <p>___ Loss of species</p> <p>___ Decreased populations</p> <p>___ Decline in biological diversity</p> <p>___ Change in community composition</p>	<p>Strategy: Protect Wetlands</p> <hr/> <p>Strategy: Restore Wetlands</p>

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) <input type="checkbox"/> Maintain wetland buffers <input type="checkbox"/> Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands <input type="checkbox"/> Establish and implement a wetland education program <input type="checkbox"/> Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes <input type="checkbox"/> Develop and make available a system for reporting wetlands violations <input type="checkbox"/> Maintain natural hydrology (no flooding, excavating or draining) <input type="checkbox"/> Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do not overload their filtering capacity) <input type="checkbox"/> Develop a strategy for eliminating exotic species and preventing them from displacing native species <input type="checkbox"/> Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) <input type="checkbox"/> Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review¹⁰ <input type="checkbox"/> Maintain vegetative structure and the associated ecological community 		
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Restore natural hydrology by plugging ditches and restoring flows <input type="checkbox"/> Restore native vegetation <input type="checkbox"/> Remove fill <input type="checkbox"/> Remove exotic species <input type="checkbox"/> Establish and maintain buffers <input type="checkbox"/> Eliminate runoff, nutrients, toxics and sediments <input type="checkbox"/> Manage stormwater flows <input type="checkbox"/> Reestablish connectivity 		
<p align="center">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		

¹⁰ A wetland map is not a substitute for a site visit.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>Degraded wetland and vernal pool health <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>1. Increased erosion and loading of sediment, toxics and nutrients from stormwater, agriculture, road sanding, construction site runoff and cleaning roadside ditches.</p> <p>2. Altered water levels.</p> <p>3. Drainage for agricultural, commercial and residential purposes.</p> <p>4. Mosquito control (e.g. chemical application)</p> <p>5. Invasive species displacing native species</p>	<p>Check those impacts that apply:</p> <p><input type="checkbox"/> Decreased biological productivity in the food web</p> <p><input type="checkbox"/> Loss of natural nutrient cycling</p> <p><input type="checkbox"/> Loss of species</p> <p><input type="checkbox"/> Decreased populations</p> <p><input type="checkbox"/> Decline in biological diversity</p> <p><input type="checkbox"/> Change in community composition</p> <p><input type="checkbox"/> Fish kills</p> <p><input type="checkbox"/> Disease</p>	<p>Strategy: Protect Wetlands</p> <hr/> <p>Strategy: Restore Wetlands</p>

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> ___ Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) ___ Maintain wetland buffers ___ Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands ___ Establish and implement a wetland education program ___ Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes ___ Develop and make available a system for reporting wetlands violations ___ Maintain natural hydrology (no flooding, excavating or draining) ___ Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do nt overload their filtering capacity) ___ Develop a strategy for eliminating exotic species and preventing them from displacing native species ___ Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) ___ Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review¹¹ ___ Maintain vegetative structure and the associated ecological community 		
<p>Options:</p> <ul style="list-style-type: none"> ___ Restore natural hydrology by plugging ditches and restoring flows ___ Restore native vegetation ___ Remove fill ___ Remove exotic species ___ Establish and maintain buffers ___ Eliminate runoff, nutrients, toxics and sediments ___ Manage stormwater flows ___ Reestablish connectivity 		
<p align="center">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		

¹¹ A wetland map is not a substitute for a site visit.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Impacts	Remedial & Preventative Strategies
<p>Loss of benefits to streams, rivers, lakes, ponds and reservoirs from loss/degradation of wetlands and vernal pools ___ Yes ___ No</p>	<p>1. Filling for development.</p> <p>2. Increased sedimentation from stormwater, agriculture, road sanding, construction site runoff and inflowing streams.</p> <p>3. Drainage for agricultural, commercial and residential purposes.</p> <p>4. Mosquito control.</p> <p>5. Fragmentation or loss of connectivity.</p>	<p>Check those impacts that apply:</p> <p>___ Increased flooding and flood damages</p> <p>___ Decreased water quality</p> <p>___ Decreased erosion and sediment control</p> <p>___ Loss of aquatic species</p> <p>___ Loss of recreational opportunities</p>	<p>Strategy: Protect Wetlands</p> <hr/> <p>Strategy: Restore Wetlands</p>

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> ___ Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) ___ Maintain wetland buffers ___ Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood)in wetlands ___ Establish and implement a wetland education program ___ Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes ___ Develop and make available a system for reporting wetlands violations ___ Maintain natural hydrology (no flooding, excavating or draining) ___ Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do nt overload their filtering capacity) ___ Develop a strategy for eliminating exotic species and preventing them from displacing native species ___ Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) ___ Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review¹² ___ Maintain vegetative structure and the associated ecological community 		
<p>Options:</p> <ul style="list-style-type: none"> ___ Restore natural hydrology by plugging ditches and restoring flows ___ Restore native vegetation ___ Remove fill ___ Remove exotic species ___ Establish and maintain buffers ___ Eliminate runoff, nutrients, toxics and sediments ___ Manage stormwater flows ___ Reestablish connectivity 		
<p align="center">We suggest you also complete the Stormwater Management Worksheet to further assess impacts on your community.</p>		

¹² A wetland map is not a substitute for a site visit.

Issues Associated with Aquatic Fish and Wildlife Habitat Management	Causes	Positive Benefits	Remedial & Preventative Strategies
<p>Our municipality is concerned about (please check all that apply):</p> <p><input type="checkbox"/> How to best protect the highest quality aquatic habitat before it gets degraded.</p> <p><input type="checkbox"/> How to prioritize aquatic resources for protection.</p> <p><input type="checkbox"/> How we can get the community and decision makers to recognize that high quality aquatic resources provide quality of life, recreational and economic benefits to the community and take steps to preserve and protect them.</p> <p><input type="checkbox"/> Receiving and providing the best information and training to people who make decisions about development and aquatic resources in our community (e.g. contractors, engineers, municipal officials)</p> <p><input type="checkbox"/> Confusion over local authority to address aquatic resource concerns</p> <p><input type="checkbox"/> How to explain the importance of the biological productivity of wetlands and the effect it has on our economy to decision makers and the community.</p>	<p>1. At present community is not implementing an aquatic resource management program and its associated plan.</p> <p>2. The community is experiencing development pressure, but is having difficulty balancing economic development and growth and natural resource protection needs (including wetlands, flood plains and water quantity).</p> <p>3. Community does not have adequate resources to enforce aquatic resource protection ordinances.</p>	<p>Check those impacts that apply:</p> <p><input type="checkbox"/> The preservation and enhancement of aquatic resources has a positive effect on the local economy and property values.</p> <p><input type="checkbox"/> High quality of life.</p> <p><input type="checkbox"/> The preservation and enhancement of aquatic resources positively impacts fish and wildlife, decreasing the need for costly restoration and remediation.</p> <p><input type="checkbox"/> Protection and enhancement of aquatic resources perpetuates beneficial ecosystem services.</p>	<p>Strategy: Protect Stream and River Corridors</p> <hr/> <p>Strategy: Restore Stream and River Corridors</p> <hr/> <p>Strategy: Protect Lakes, Ponds and Reservoirs</p> <hr/> <p>Strategy: Protect Wetlands</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: <input type="checkbox"/> Develop, implement and enforce floodplain management land use regulations <input type="checkbox"/> Identify and protect rare, endangered and threatened aquatic species		
Options: <input type="checkbox"/> Implement floodplain management practices <input type="checkbox"/> Implement stormwater management practices		
Options: <input type="checkbox"/> Develop a strategy for eliminating exotic species and preventing them from displacing native species		
Options: <input type="checkbox"/> Develop, implement and enforce wetland regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools) <input type="checkbox"/> Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands <input type="checkbox"/> Establish and implement a wetland education program <input type="checkbox"/> Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes <input type="checkbox"/> Develop and make available a system for reporting wetlands violations <input type="checkbox"/> Develop a strategy for eliminating exotic species and preventing them from displacing native species <input type="checkbox"/> Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands) <input type="checkbox"/> Make wetlands maps (state Federal and local (where applicable) available to the public, planning board, building inspector and code enforcement officer for review ¹³		
<p>We suggest you also complete the Land Use Planning Needs Worksheet and to further assess the balance of development and economic growth in your community.</p>		

¹³ A wetland map is not a substitute for a site visit.

Community Environmental Management

TIER III: AQUATIC FISH AND WILDLIFE HABITAT MANAGEMENT STRATEGY DEVELOPMENT

Aquatic fish and wildlife habitat management is a complex issue, with many factors contributing to the topic. The following are six strategies for managing these resources in communities.

STRATEGY – Protect Stream and River Corridors

- Maintain undisturbed riparian buffers
- Establish stream and river setbacks
- Develop, implement and enforce floodplain management land use regulations
- Implement stormwater management practices
- Maintain water budget in surface and groundwater (e.g. regulate withdrawals/diversions, no change in pulsing amount and timing)
- Maintain thermal regime¹⁴ (includes limiting damming and stormwater discharges, and maintain shading)
- Maintain in-stream cover by limiting snagging and clearing (logs, sticks, rocks, etc.)
- Maintain balanced sediment budget
- Identify and protect rare, endangered and threatened aquatic species
- Maintain natural channel form (e.g. limit gravel mining and hardened banks)
- Develop a strategy for eliminating exotic species and preventing them from displacing native species
- Ensure stream/river crossings (bridges/culverts) do not impede fish movement and downstream transport of sediment

STRATEGY – Restore Stream and River Corridors

- Replace/install native buffers, including trees
- Restore natural stream form
- Mitigate barrier impacts (e.g. remove dams, install fish ladders, breach dams, perform water releases, fix culverts/bridge design to allow for fish movement and downstream transport of sediment)
- Implement floodplain management practices
- Implement stormwater management practices
- Restore water budget
- Restore in-stream habitat
- Reduce excess sediment loads
- Eliminate or control exotic species

STRATEGY – Protect Lakes, Ponds and Reservoirs

- Prevent nutrient enrichment from onsite waste treatment systems (e.g. septics) and agricultural runoff
- Prevent sediments and toxics (e.g. fertilizers, pesticides, oil) from entering stormwater
- Maintain littoral (near shore) habitat and associated native aquatic vegetation
- Maintain the riparian area/shoreline
- Maintain water budget (e.g. no winter drawdown¹⁵)
- Develop a strategy for eliminating exotic species and preventing them from displacing native species
- Minimize overwater structures (e.g. docks)

¹⁴ Temperature can be a limiting factor for trout populations. Certain activities (e.g. pond construction, stormwater discharges from impervious surfaces, and removal of riparian vegetation) can all increase stream temperature.

¹⁵ Winter drawdowns are detrimental, as they kill existing native vegetation in the littoral zone. If done early in the Fall they preclude the use of a littoral zone by amphibians. If done later, they can kill overwintering amphibians.

STRATEGY – Restore Lakes, Ponds and Reservoirs

- Control point and nonpoint sources of pollution (e.g. sediments, toxics, nutrients) from stormwater, onsite systems (septics) and agriculture by implementing BMPs on construction sites, farms, golf courses and lawns
- Restore streams flowing into lakes, ponds and reservoirs
- Soften shorelines (e.g. where possible use native vegetation for streambank stabilization rather than stone, concrete, or sheet piling)
- Restore natural water budget (e.g. eliminate winter drawdown for vegetative control)
- Eliminate or control exotic species
- Re-establish natural native aquatic vegetation (e.g. reduce aquatic weed control)
- Establish shoreline buffers

STRATEGY – Protect Wetlands

- Develop, implement and enforce buffer regulations for wetlands, including hydrologically isolated wetlands (e.g. vernal pools)
- Maintain wetland buffers
- Prevent filling, draining, changing water levels, introducing discharges (e.g. pollutant and direct stormwater discharges) and removing all vegetation (except selective cutting/fuel wood) in wetlands
- Establish and implement a wetland education program
- Develop a brochure to be included with each building permit application or site plan submittal for wetlands education purposes
- Develop and make available a system for reporting wetlands violations
- Maintain natural hydrology (no flooding, excavating or draining)
- Prevent nutrient, toxics and sediment loading to wetlands beyond background levels (do not overload their filtering capacity)
- Develop a strategy for eliminating exotic species and preventing them from displacing native species
- Maintain wetland connectivity (e.g. when granting waivers or variances, do not isolate wetlands)
- Make wetlands maps (State, Federal and local (where applicable)) available to the public, planning board, building inspector and code enforcement officer for review¹⁶
- Maintain vegetative structure and the associated ecological community

STRATEGY – Restore Wetlands

- Restore natural hydrology by plugging ditches and restoring flows
- Restore native vegetation
- Remove fill
- Remove exotic species
- Establish and maintain buffers
- Eliminate runoff, nutrients, toxics and sediments
- Manage stormwater flows
- Reestablish connectivity

¹⁶ A wetland map is not a substitute for a site visit.

