

Proposed Restoration Goals and Milestones for the Nine Identified Beneficial Use Impairments (BUIs) of the St. Louis River System Area of Concern (AOC)

1. Fish Consumption Advisories
2. Degraded Fish and Wildlife Populations
3. Fish Tumors and Deformities
4. Degradation of Benthos
5. Restriction on Dredging
6. Excessive Loading of Nutrients and Sediments
7. Beach Closing and Body Contact
8. Degradation of Aesthetics
9. Loss of Fish and Wildlife Habitat

1. Fish Consumption Advisories

Goal

Significantly reduced negative human health impacts resulting from consumption of fish from the Area of Concern (AOC), including western Lake Superior, achieved by a dual strategy of residue reduction in the environment and public education leading to modified fish consumption patterns. Achievement of the goal will result in consumers of fish from the AOC who have a reduced health risk due to consumption of fish and are effectively informed about the potential health benefits of a selected fish diet, as well as the risks.

Milestones

- By 2010, public program focusing on the harmful effects of mercury, PCBs and dioxins educates a majority of the fish consuming public, achieving improved protection of human health through greater awareness and measurable adjustments in consumption patterns accomplished through contacts with the fishing public and fish consumers.
- By 2020, only large (trophy sized) sport fish should not be consumed due to their toxicity. Medium sized and smaller fish can be consumed with no apparent health risk. For example,

walleyes up to X inches are safe to eat Y meals per month [X & Y to be determined by fisheries and health department personnel].

2. Degraded Fish and Wildlife Populations

Goals

Rehabilitate, maintain, protect, and enhance native wildlife and fish populations in accordance with the goals of the “Lower St. Louis River Habitat Plan.” In addition, this use will be considered restored when toxicity (as defined by relevant, field-validated, bioassays with appropriate quality assurance/quality controls) of sediment-associated with all contaminated sites is not significantly higher than reference sites.

Goal for Native Fish Assemblage:

- Healthy, self-sustaining populations of native fish species.

Goal for Lake Sturgeon:

- A healthy, self-sustaining western Lake Superior lake sturgeon population.

Goal for Native Mussel Assemblage:

- Healthy populations of all native mussels.

Goal for Breeding Bird Assemblage:

- Breeding birds continue to nest in the lower St. Louis River area at current or higher numbers.

Goal for Migratory Bird Assemblage:

- The lower St. Louis River continues to attract and support the enormous diversity and numbers of migrating birds.

Goal for Piping Plover:

- A breeding population of piping plover is established in the estuary.

Goal for Common Tern:

- The breeding population of common terns in the Lower St. Louis River should, at a minimum, be maintained at its current level. Recommendations from the U.S. FWS species assessment will be used to update and refine this conservation goal.

Milestones

1) Fish

- Fish populations are not significantly affected by alterations and loss of physical habitat, by proliferation of exotic species, or by exposure to contaminants.
- Spawning habitat below Fond du Lac Dam is optimized for pertinent species with specific reduction in mortality of adults by standing and desiccation of eggs.
- Lake sturgeon have re-established self-sustaining status in the St. Louis River estuary and western Lake Superior.
- Exotic fish species (Eurasian ruffe, round goby, tubenose goby) have become balanced members of the fish community with no significant impacts on native fish species.
- Purple loosestrife population is reduced by 75% of the 2002 best available information of population level within estuary. The invasion of Eurasian water milfoil into the St. Louis River has been prevented.
- No significant pathological alterations in fish.
- Fish sampled on Crawford Creek (tributary to the Nemadji River) do not have spinal deformities or tumors.

2) Wildlife Populations

- Populations of the common tern and the piping plover (threatened and endangered species), great blue herons, and mallards are not declining due to alteration, loss of physical habitat or exposure to contaminants.

- A breeding population of piping plover is re-established in the estuary.
- Public lands within the AOC are managed to ensure that appropriate habitat exists for at least one great blue heron rookery.
- The breeding population of common terns in the Lower St. Louis River is maintained at its current (2004) level.
- No common tern chicks with cross-bills are found at Interstate Island.
- Resident bird populations are not accumulating unhealthy levels of contaminants at the Erie Pier Confined Disposal Facility (CDF).

3. Fish Tumors and Deformities

Goal

Incidence of tumors and deformities in fish is no greater than in high quality Lake Superior tributaries near the estuary.

Milestones

- By 2010, research must be completed to definitively determine the presence or absence of tumors.
- By 2010-2020, if continuing instances of tumors and deformities are found, research must determine the nature, extent, and causes of the tumors and deformities and how they affect other populations.
- By 2020, a monitoring program is in place before removing BUI from list.

4. Degradation of Benthos

Goal

The benthic macroinvertebrate community structure and productivity and sediment-associated toxicity and bioaccumulation do not significantly diverge from un-impacted reference sites of comparable physical and biological characteristics.

Milestones

- No noticeable toxicity related to the “hotspots” which can be attributed to contaminated sediments.

- By 2020, all known “hot spots” are cleaned up. “Hot spots” include:
 - U.S Steel and St. Louis River/Interlake/Duluth Tar Superfund sites
 - Hog Island Inlet/Newton Creek
 - RCRA corrective action sites (such as Crawford Creek, Howard’s Pocket)
 - “orphan” sites (such as Minnesota Slip, Slip C, 21st Avenue West and others)

In addition, the consumption of benthic invertebrates by fish and wildlife does not contribute to fish consumption advisories.

5. Restrictions on Dredging (Interim)

Goal

The natural resource habitats and public beneficial uses of the areas affected by contaminated sediments in the St. Louis River AOC are restored and the threat to adjoining habitats is removed. Contaminated sediments in the river and estuary are remediated:

- To restore the beneficial uses to areas within the St. Louis River AOC where sediments are contaminated with PAHs and other contaminants.
- To remediate and remove contaminated sediments as soon as possible and institute source controls where needed as soon as possible.
- Management decision-makers for contaminated sediments consider technical, social, and economic factors in selecting remedial alternatives.

Milestones

- Goals for cleanup and rehabilitation are developed and have community support.
- Funding obtained for the remediation of contaminated sites in the AOC.
- Half of contaminated sediment-impacted acreage is remediated by 2015.
- Increase the acreage of sheltered bays by one fifth through remediation and restoring ecological services of industrially influenced bays. Sheltered bays are one of the most valuable habitat types in the St. Louis River estuary.
- Appropriate source controls are developed for each contaminated sediment area.
- Stormwater controls and BMPs are in place to avoid loading of PAHs and other pollutants.

6. Excessive Loadings of Nutrients and Sediment to Lake Superior

Goal

Nutrient and sediment levels in the St. Louis River estuary do not result in excessive loadings to Lake Superior. Nutrient and sediment levels do not impair habitat, and do not restrict recreation, including fishing, boating or body contact recreation in the estuary and within western Lake Superior.

Milestones

- By 2015, average annual total phosphorous concentration, as measured at three representative locations in the estuary, is reduced 50%,
- By 2030, average annual total phosphorous concentration, as measured at three representative locations in the estuary, is reduced by 75%.

7. Beach Closings and Body Contact

Goal

Reasonably low risk of health impairment resulting from body contact recreation.

Low frequency of beach closings based on established and maintained monitoring program.

Milestones

- Beach closings and their associated health risks occur infrequently.
- Monitoring programs allow for speedy reaction to impairments, and are not limited due to financial constraints.

- Water quality monitoring is occurring on a regular basis by a monitoring procedure approved by applicable health departments.
- Root causes for beach closings are identified through research.
- The identified sources are dealt with in a timely manner.
- Educational campaign is in place and is effectively informing the public.
- No sewage overflows have occurred in a three-year span due to rain events of less than 20-year frequency.
- All municipalities have effective stormwater reduction programs in place

8. Degradation of Aesthetics

Goal

Odors and sightings of spills, oil slicks, oil blooms, etc. are eliminated in the St. Louis River AOC including, but not limited to, the Stryker Bay/Interlake/Duluth Tar, USS (USX), Crawford Creek and Hog Island Inlet/Newton Creek sites.

Milestones

- Effective public awareness campaign including guidance for citizens to report complaints of smells, oil blooms, etc are in place.
- Five consecutive years of no sightings and/or complaints for areas listed in goal.
- Effective spill response measures are implemented and enforced.
- Zoning regulations are in place and enforced in both states to prevent new construction from degrading the aesthetics of the SLR AOC.

9. Loss of Fish and Wildlife Habitat

Goals

Maintain, enhance, protect and rehabilitate native wildlife and fish habitat in accordance with the goals of the “Lower St. Louis River Habitat Plan”.

Goal for Large Riverine Reach:

- Natural flow regime is replicated in the large riverine reach to the extent possible; this should benefit all of the estuarine aquatic habitats.

- Any loss of area or degradation of this habitat type is avoided.
- Native fish assemblage including identified life stages of walleye, lake sturgeon, longnose sucker, white sucker, smallmouth bass and muskellunge, continue to utilize the large riverine reach. Darters and other riverine-obligate fish species are also present.
- Migratory raptors and waterfowl use this habitat, particularly during spring migration.

Goal for Upper Estuarine (Undredged) River Channel:

- Natural flow of the river is replicated to the extent feasible.
- Channel morphology reflects the natural hydrologic regime to the extent that it can be replicated.
- Any loss of area or further degradation of this habitat type is avoided.
- High abundance of native mussels and other invertebrates is ensured.
- Identified life stages of channel catfish, walleye, smallmouth bass, stonecat, burbot, lake sturgeon, and other native fish utilize the habitat.

Goal for Lower Estuarine (Dredged) Channel:

- Water quality is improved and the natural hydrologic regime is replicated to the extent possible.
- Any loss of this open water habitat is minimized.
- Further degradation of this habitat is minimized.
- Native species utilize this habitat at current (2004) or higher levels.

Goal for Upper Estuary Flats:

- The current condition of the upper estuary flats are maintained and enhanced.
- The areas of ecologically appropriate vegetated wetlands have been increased and appropriate vegetation has been re-establishment.
- Patches of submergent and floating-leaved vegetation, including pondweeds, water lilies, wild celery, and wild rice, are present in some areas; these areas are intermingled with areas of open water, depending on water depth and clarity.
- Emergent vegetation, including bulrushes, cattails, and arrowhead, have increased in shallow littoral areas. The location and size of patches of open water and wetland vegetation will vary over time due to variations in the natural hydrologic regime.
- Non-native plant species have been significantly reduced.
- Native fish and bird species continue to utilize this habitat; breeding bird and spawning fish diversity increase as habitat improves.

Goal for Sheltered Bays:

- Sheltered bays that are in good condition are protected and maintained.

- All sheltered bays are in good condition. Where possible, sheltered bay habitat has been rehabilitated.
- Non-native plant species have been significantly reduced.
- Patches of submergent and floating-leaved vegetation, including pondweeds, water lilies, wild celery, and wild rice, are present in some areas; these areas are intermingled with areas of open water, depending on water depth and clarity.
- Emergent vegetation, including bulrushes, cattails, and arrowhead, are present in very shallow littoral areas. The location and size of patches of open water and wetland vegetation will vary over time due to variations in the hydrologic regime.
- Wet meadows and shrub swamps are present in some areas around the perimeter of sheltered bays.
- Hydrologic regime of contributing watersheds, along with sediment deposition and transportation are within the natural range of variation.
- Diversity of native fish, birds, and other species utilizing this habitat is high.

Goal for Clay-Influenced River Mouths:

- Tributaries' hydrologic regime, erosion, and sediment inputs have been rehabilitated and healthy watershed conditions protect and improve clay-influenced bays, especially within urban watersheds.
- Emergent, floating-leaved, and submergent native plants are present in areas where water depth naturally supports these types of wetland vegetation.

Goal for Industrially-Influenced Bays:

- Loss of open water in industrially-influenced bays has been minimized.
- Some industrially-influenced bays have been rehabilitated to habitat similar to the sheltered bays (in good condition). This includes a diversity of native emergent, floating-leaved, and submergent vegetation, as well as increased diversity of native fish and bird species utilizing this habitat type.
- Contaminated sediments have been remediated.

Goal for Industrial Slips:

- Since shipping is an important industry in the Twin Ports area, the loss of any open water or wetland components of these habitats (due to filling or other activities) is avoided.
- Native species utilize this habitat at current (2004) or higher levels. Contaminated sediments have been remediated.

Goal for Lower Estuary (Industrial Harbor) Flats:

- Loss or further degradation of the lower estuary flats aquatic habitat has been minimized.

- Portion of the flats have been restored to an appropriate vegetated condition.
- Native species utilize this habitat at current (2004) or higher levels.

Goal for Clay-Influenced Bay:

- Relatively good quality of this habitat has been maintained and enhanced.
- Turbidity has been reduced to its natural range of variation; the natural hydrologic regime of the tributaries feeding this bay has been rehabilitated.
- Diversity of native aquatic plants is ensured; non-native plant species are not present.
- The diversity of native fish and bird species utilizing this habitat is enhanced.

Goal for Clay-Influenced Tributaries:

- Hydrology and related sediment loads within the respective watersheds have been rehabilitated and healthy watershed conditions protect and improve clay-influenced bays, especially within urban watersheds.
- Native species utilize this habitat at current (2004) or higher levels. Degraded in-stream habitat has been restored.

Goal for Bedrock-Influenced Tributaries:

- Hydrology and related sediment loads within the respective watersheds are managed to more closely resemble presettlement conditions.
- Native species continue to utilize this habitat at current (2004) or higher levels. Degraded in-stream habitat has been rehabilitated.

Goal for Great Lakes Coastal Wetland Complex:

- Wetland vegetation that makes up the Great Lakes coastal wetland complexes has been protected, enhanced, and restored.
- Existing wetland complexes in the sheltered bays, the upper estuary flats, the clay-influenced bay (Allouez Bay), and clay-influenced river mouths are maintained and enhanced.
- The components of the wetland complexes (e.g., submergent marsh, emergent marsh) in the industrially-impacted habitats are restored.

Goal for Baymouth Bar Communities (Beaches, Beachgrass dunes, Dune shrublands, Interdunal wetlands, Dune pine forests):

- Health of the plant communities has improved.
- Diversity of native species expected in each plant community type is present.
- Non-native plant species are not present.
- Ornamental species and species native to the U.S. that would not normally occur in these plant communities have been eliminated (e.g., Scot's pine (*Pinus sylvestris*), spotted knapweed).

- Extent of the dune pine forest and juniper-lichen shrubland has been increased to the maximum acreage that is feasible and where they would naturally occur.
- Interdunal wetlands in appropriate low areas are restored; species that are naturally found in this community include bluejoint (*Calamagrostis canadensis*), various sedges (*Carex* spp.), twig-rush (*Cladium mariscoides*), spikerush (*Eleocharis* spp.), and others.
- Beachgrass dune plant community is maintained and protected.

Goal for Upland Forest Communities (White pine-red pine forest, Northern conifer-hardwoods forest / Northern hardwoods forest, Spruce-fir boreal forest):

- Existing high quality remnants of upland forest communities are restored and enhanced, and the remaining forested area are restored to the composition and structure that would be expected if its ecological processes were operating within their natural range of variation.
- Detailed recommendations and estimates of the expected natural range of variability developed by Frelich (1999) for northeastern Minnesota forest ecosystems are followed.
- Further assessments have been completed to determine the range of spatial patterns of the patches of the different successional stages.

Goal for Other Inland Plant Communities (Eroding clay bluffs, Clay seeps, Conifer swamps, Hardwood swamps, Shrub swamps, Inland marshes, Wet meadows, Fens, Cliffs and rock outcrops):

- Although small and less visible, the other inland plant communities are managed to maintain and/or improve their condition.
- Appropriate assemblage of native plant species are present; refer to NatureServe's *International Classification of Ecological Communities: Terrestrial Vegetation* (2001) for descriptions of species composition.
- Ecosystem processes, including hydrology and fire, are functioning within their natural range of variation.

Goal for Wild Rice:

- Healthy populations of wild rice are restored to appropriate wetland habitats in the estuary.

Milestones

- By 2010, fish and wildlife habitat in the AOC is not threatened by further intensive land conversion or invasion of undesirable exotic species. In addition, the contaminated sediments in the river and estuary and the high sedimentation rates in the AOC are not further contributing to the loss or degradation of habitat.

- By 2020, the recovery of beneficial uses within the AOC can be demonstrated by trends of generally increasing extent and quality of aquatic and terrestrial habitats. To achieve these milestones the following steps must be taken:
 - By 2006, initiate large-scale restoration and enhancement projects for existing and historic habitat types listed within the “St. Louis River Habitat Plan”.
 - By 2010, complete protection of all possible existing aquatic, wetland, shoreland and near-shore areas through public ownership, easement, designation, or voluntary agreement for the areas from Fond du Lac dam to Stryker Bay and Allouez Bay to prevent additional habitat from being converted, or degraded. Additional habitat conversion, or degradation would further impair the ability and likelihood of recovery of beneficial uses 2 & 9 within the AOC.
 - By 2010, complete protection of strategic upland and watershed lands within the AOC through ownership, easement, designation, or voluntary agreement to protect existing priority AOC habitats and to prevent, or reduce, watershed stressor inputs into the St. Louis River and estuary.
 - By 2015, long term management plans and operational agreements are in place to monitor, manage, and mimic the biophysical processes that naturally create, maintain, and transform fish and wildlife habitats within the lower St. Louis River and Estuary (including, but not limited to: hydrology, fine and coarse sediment, fire, water quality).
 - By 2020, reduce occurrence of purple loosestrife by 75% by mechanical, chemical and biological means within the lower St. Louis River and estuary (using 2002 as the baseline). Prevent the invasion of Eurasian water milfoil into the St. Louis River.
 - Complete remediation of contaminated sediments at St. Louis River/Interlake /Duluth Tar and U.S. Steel (St. Louis River) and Newton Creek/Hog Island Inlet (Superior Bay) and complete habitat restoration at these sites. As much of the contaminated material as possible has been removed so this material does not impair the impacted sites or does not threaten the rest of the estuary.