

Vegetation Management Plan- Headrace Embankment Argo Dam April 30, 2010

Background

The Argo Dam headrace embankment is a 1500 foot long earthen embankment that provides the millrace and canoe portage around Argo Dam. At the crest of the embankment is a foot path and growing on the sides of embankment are vegetated areas consisting of woody shrubs and trees. According to the Michigan Department of Natural Resources and Environment (MDNRE), the extensive root systems of woody plants compromise the stability of the earthen embankment. The woody vegetation also impedes visual inspection of the toe drains and embankment. For these reasons, MDNRE requires that earthen embankments be free of woody vegetation.

This document contains the proposed vegetation management plan for the headrace embankment. MDNRE has indicated that there is no need for removal of vegetation in the swale at the toe of the embankment or along the river's edge. As such, this plan will only address vegetation management on the earthen embankment. The phasing of the work took into consideration: the impacts that vegetation removal can have on the stability of the embankment; the opportunity for tree removals to be coordinated with construction of the selected alternative to address the repair of the toe drains in 2011, which could involve substantial reconstruction of the millrace and embankment; and the need to communicate and educate the residents about the vegetation removal.

Vegetation & Vegetation Management on the Headrace Embankment

Current vegetation on the Argo Headrace Embankment includes:

- Shrubs and brush, and
- Trees

1. Shrubs and Brush

The woody shrubs and brush on the embankment consists of primarily non-native shrubs, including Honeysuckle (*Lonicera sp.*) and Buckthorn (*Rhamus sp.*). Due to their early bud break and prolific fruiting, these species quickly establish and colonize disturbed areas. A comprehensive inventory of the shrubs has not been undertaken but it is estimated that there are several hundred shrubs along the embankment.

Shrubs and Brush Management

Immediate Concerns

There is a population of Purple Turtlehead (*Chelone obliqua*) a state listed endangered plant species at the east end (closest to concrete dam structure) of the embankment on the east side. Due to its status as an endangered species, no woody vegetation removal will occur within 10 feet of the turtlehead population during the growing season. Care will be taken to ensure that cut shrubs do not fall onto the plants. When the turtlehead is dormant, the remaining vegetation will be removed by hand. No mechanical equipment is planned to be used in the area of the turtlehead; however, if it is determined that mechanized equipment is needed the City will apply for a threatened and endangered species permit through MDNRE prior to equipment being used.

Short Term

Timeframe: March 2010 – June 30, 2010

As of March 25, 2010, the City began removing the woody shrubs along the headrace embankment. Crews from the City's Public Services Area are removing the shrubs by hand

using saws and pruners. The stumps are being treated with the herbicide to keep them from re-sprouting-- Pathfinder II (active ingredient: *triclopyr*) when the plants are dormant and Triclopyr salt formulation during the growing season. The herbicide is being painted on the stumps with a foam applicator. The crews have started on the east end (farthest from concrete dam structure) of the embankment and will move west, working on both sides of the embankment. No herbicide will be used within the 10 foot buffer surrounding the Purple turtlehead, unless MDNRE determines that it is safe to be used in this area.

Mid - Long Term

Timeframe: Begin Summer 2010

The vegetation on the headrace embankment will be monitored for sprouting 2-3 times per year by the City's Public Services or Community Services staff. Any woody shrubs/brush discovered during inspection will be removed.

2. Trees

There are 311 trees on the earthen embankment, swale at the toe of the embankment and along the river, according to a tree inventory completed by the city in 2007 (see attached). The trees range in size from 1" to 38" in diameter at breast height (DBH). The predominant species of trees on the embankment include Mulberry (*Morus alba*), Black Willow (*Salix nigra*), Elm (*Ulmus sp.*), Cottonwood (*Populus deltoides*), Green Ash (*Fraxinus pennsylvanica*), Tree of Heaven (*Ailanthus altissima*) and Boxelder (*Acer negundo*).

Of the 311 trees, 196 trees are located off the embankment, either in the swale at the base of the embankment or in the ridge that runs along the river. The majority of trees in the swale at the toe of the embankment are dead ash trees. Of the trees off the embankment, 24 are considered landmark trees according to city ordinance. Of these landmark trees, 7 of them (all Cottonwood trees) have canopies that extend over the embankment.

The 7 landmark trees that are off the embankment and have canopy that extends over it should not pose a risk to the embankment. These trees are growing along the river on a ridge that is 3-4 feet above the swale at the toe of the embankment. The roots of the 7 trees terminate in the shallow soil of the swale where oxygen and nutrients are readily available. Because the root system of these landmark trees does not extend into the embankment, these seven trees will not be removed. A map which identifies these 7 trees is attached.

Note: If any landmark tree(s) is removed, mitigation tree planting must occur that is equal to 50% of the diameter at breast height of the tree(s) that has been removed. The mitigation tree planting can occur on any city property.

Tree Management:

Immediate Concerns

There is a population of Purple Turtlehead (*Chelone obliqua*) a state listed endangered plant species at the east end (closest to concrete dam structure) of the embankment on the east side. Due to its status as an endangered species, no woody vegetation removal will occur within 10 feet of the turtlehead population during the growing season. Care will be taken to ensure that cut trees do not fall onto the plants. When the turtlehead is dormant, the remaining vegetation will be removed by hand. No mechanical equipment is planned to be used in the area of the turtlehead; however, if it is determined that mechanized equipment is needed the City will apply for a threatened and endangered species permit through MDNRE prior to equipment being used.

Short Term

Timeframe: May 2010-September 30, 2010

In the short term the trees on the embankment and in the swale that are listed in the survey as in poor condition or dead will be removed. These trees pose a hazard to people and the stability of the embankment. Tree removal will be completed by the City's Public Services Area staff or contractors. All logs and tops from the removed trees will be taken off the embankment and hauled away. The stumps will be cut flush with the ground and painted with herbicide to prevent re-sprouting. No re-vegetation will occur. No herbicide will be used within the 10 foot buffer surrounding the Purple turtlehead, unless MDNRE determines that it is safe to be used in this area.

The weight/size of machinery, equipment and vehicles can have an impact on the stability of the earthen embankment and therefore are not feasible for use during the removal of the trees on the embankment. All tree cutting (including log and brush removal) will need to be done by hand. Vehicles/machinery can be staged off the earthen embankment and used to pull logs (winch) from the embankment, if necessary. To be consistent with the shrub removal, tree removal will begin on the east end of the embankment and move west, removing trees on both sides of the embankment. In areas that are too wet in the spring, tree removal will occur in late summer/early fall.

Long Term

Timeframe: Begin Summer 2011

The city is weighing several options for construction work on the headrace embankment, including repairing the toe drains or reconfiguring the millrace and headrace embankment. The decision on these options will be made in late 2010/early 2011.

Removal of remaining trees on the embankment and in the swale at the toe of the embankment will be done by December 31, 2011 unless approval for some to remain is given in writing by the MDNRE.

Beginning in the summer of 2010 the vegetation on the headrace embankment will be monitored for sprouting 2-3 times per year by Public Services or Community Services staff. Any woody vegetation discovered during inspection will be removed.

Stump Removal and Revegetation

As mentioned above that the City is initiating the process to evaluate options for construction work on the headrace embankment. The long-term plan for stump removal and re-vegetation will be developed and submitted for approval following the construction that will occur on the headrace embankment.