

## Vegetation Management Plan- Headrace Embankment Argo Dam April 8, 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 100 feet of the Purple Turtlehead population.

##### *Short Term*

*Timeframe: March 2010 – June 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 will be painted with an herbicide to keep them from re-sprouting. 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.

*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*). This plan will address those trees along the earthen embankment.

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 100 feet of the Purple Turtlehead population.

*Short Term*

*Timeframe: May 2010-November 2010*

The first priority for tree removal will be the trees along the embankment that are listed in the survey as in poor condition or dead. 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, depending on city staff workload. 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. In the area with the Purple Turtlehead plant, no herbicides will be used.

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 invasive and non-invasive trees along the embankment will be addressed as part of the headrace construction work mentioned above with timing contingent on MDNRE approval of the option selected and issuance of permits\*.

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.