

### Mosquito Control Program Approach

#### Considerations for Biological Pest Control Measures

There are three broad types of biological control, where human input is involved:

- Conservation - working to ensure the conservation of existing natural enemies already present
- Classical - introduction of natural enemies to a new locale
- Augmentation - the supplemental release of natural enemies (to increase existing populations)

The most commonly used classical biological control agent for mosquitoes is Bti (*Bacillus thuringiensis israelensis*). The City has used larvicide products containing proteins from this naturally occurring soil bacteria since 1980. Bti products are used worldwide and are toxic only to mosquito larvae and some related aquatic flies, and the products used by the City are active for less than 48 hours. This is the safest, most effective and environmentally friendly strategy for Edmonton's climate and the available pest control products in Canada.

Biological controls of any type or combination must be used consciously and carefully with understanding of the implications to the environment and biodiversity, and some components are regulated by the Federal Government. Introduction of non-native species to an area or heavily augmenting existing populations of natural enemies can have unintended consequences like eliminating native species or upsetting local population balances. Available habitat is also a factor. Habitat restoration or enhancement can take many years and can be impeded by competing interests, especially in an urban environment. For example, stormwater management facility naturalization has the potential to offer habitat for mosquito predators (e.g. dragonflies, birds), but is a disputed activity in some neighborhoods.

The reproductive strategy for mosquitoes is to overwhelm predators by numbers (especially with hatching waves/peaks), meaning that habitat creation which increases mosquito predators may not naturally reduce mosquito populations enough to be noticeable to humans.

Program Areas

<b>Focus</b>	<b>Tactics</b>
Mosquito Larvae Monitoring and Control	<ul style="list-style-type: none"> <li>● Increased monitoring in ground treatment areas (pre/post)</li> <li>● Increased monitoring outside ground treatment boundaries (prior aerial zones)</li> <li>● Increased surveillance for development sites in ground areas, private properties</li> <li>● Identifying and mitigating (removing) ground program development sites</li> </ul>
Adult Mosquito Monitoring and Control	<ul style="list-style-type: none"> <li>● Increased monitoring in ground treatment areas (pre/post)</li> <li>● Increased monitoring outside ground treatment boundaries (prior aerial zones)</li> <li>● Increased surveillance for development sites in ground areas, private properties</li> <li>● Identifying and mitigating (removing) ground program development sites</li> </ul>
Biodiversity Enhancement	<ul style="list-style-type: none"> <li>● Increased monitoring for mosquito predators and non-predatory food web species in stormwater facilities, creeks, temporary and semi-permanent wetlands/waterbodies</li> <li>● Increased surveillance for dragonflies, diving beetle and other predator development sites</li> <li>● Building and enhancing habitat through existing tree planting and naturalization programs and initiatives, as well as new community and park design</li> <li>● Bat box installation and monitoring</li> </ul>
Communications and Education	<p>Paid activities and tactics:</p> <ul style="list-style-type: none"> <li>● Digital advertising campaign</li> <li>● Social media - boosted posts</li> <li>● Video and graphic development, video series</li> <li>● Community League information package</li> <li>● Educational collateral</li> </ul> <p>Other noted tactics include:</p> <ul style="list-style-type: none"> <li>● Community pop-up and school events</li> </ul>