2 ENVIRONMENTAL PLANNING AREAS OF INTEREST

2.1 OVERVIEW

This section outlines the goals and objectives as well as the guiding principles for the UTRCA's area of planning interest which include:

- *Natural Hazards*
- Natural Heritage
- Natural Resources
- Servicing & Mitigation
- Integrated Resources & Systems Planning

This framework provides the context for the environmental planning policies which guide the UTRCA's Municipal Plan Review and Permit Processes that are presented in Sections 3 and 4 respectively.

2.2 NATURAL HAZARDS

2.2.1 Natural Hazards Planning

Natural hazard planning involves planning for risks associated with naturally occurring processes. These risks include the potential for loss of life, property damage, social disruption as well as environmental impacts.

Flood plains, unstable slopes and *erosion* are examples of naturally occurring hazardous processes. Since it is not possible to completely eliminate the threat of *natural hazards*, natural hazard planning is based on a risk management approach. This approach recognizes that there is always a risk associated with natural hazard processes and establishes an appropriate level of risk for society to be exposed too. The minimum standards for acceptable levels of risk to the general public are set by the Province.

The Authority implements natural hazard planning through its Municipal Plan Review and Section 28 Permit processes. Both of these processes consider the following factors:

- The provision of safe or dry *access* for *development*;
- Appropriate *floodproofing* measures;
- The maintenance of channel capacity and channel conveyance functions;
- Changes in *flood* storage characteristics; and
- The potential impacts from *development* or *site alteration* in the immediate area and *cumulative effects* on the system.

Because *natural hazards* extend across wide geographic areas, they should not be addressed on a piecemeal basis. Rather, they need to be considered as contiguous units using a systems management approach.

2.2.2 Goals & Objectives for Natural Hazards

The following goals and objectives guide the Authority's decision making for *natural hazards*:

1. To protect life and property from the risks associated with natural hazard processes;

2. To ensure that no new hazards are created by *development* and *site alteration*; and

3. To ensure that no adverse environmental impacts will result from *development* or *site alteration* in natural hazard areas.

2.2.3 Guiding Principles for Natural Hazards

In making decisions regarding *natural hazards*, the Authority considers the following guiding principles:

- New *development* will locate and avoid *natural hazards*;
- Existing *development*, limited *infill development* and re-*development* will locate and characterize the *natural hazard*(s) and address it;
- *Development* and *site alteration* for passive public uses will be provided more flexibility because of the public good that may be achieved;
- Recognition that some types of *development* must locate in the *flood plain* (e.g. storm outlets, and bridges);
- *Fragmentation* of *hazard lands* will be avoided;
- In considering the *natural hazards* implications of *development* and *site alteration*, natural heritage and other natural resources implications will also be considered; and
- The potential for *cumulative effects* from individual *development* and *site alteration* projects must be anticipated and in this regard, a precautionary approach will be taken when reviewing proposals.

2.2.4 Natural Hazard Features - Overview

As indicated, *natural hazards* are caused by naturally occurring physical and ecological processes which continuously shape and reshape the landscape. These processes pose risks and problems to society when they are not fully understood or effectively dealt with as part of *development* activities. *Hazard lands* in the Upper Thames River *Watershed* include the following main components:

1. Riverine Flood Hazards - *flood plain*
2. Riverine Erosion Hazards – slopes and *meander belt*
3. Watercourses – streams, rivers, creeks, ditches and municipal drains
4. *Wetlands* – includes swamps, marshes, bogs, fens and may contain organic soils

The UTRCA has completed comprehensive mapping of natural *hazard lands* for the *watershed*. The Riverine Flood Hazards, Riverine Erosion Hazards and *Watercourses* make up the *Riverine Hazard Limit*. *Wetlands* are also included as *natural hazards* in recognition of the influence that they have on watershed hydrology and also because they may contain organic soils. The maximum extent of the Riverine Hazards plus the *Wetlands* is considered to be the *hazard lands*.

An allowance of 15 metres has been added to the *Riverine Hazard Limit* for the purpose of maintaining sufficient *access* for emergencies, maintenance, and construction activities. This allowance provides an extra factor of safety, providing protection against unforeseen conditions that may adversely affect the land located adjacent to a natural hazard area. An *Area of Interference* is added to W*etlands* to recognize that *development* outside of the *wetland* boundary could have an impact on the *wetland* function.

The *Area of Interference* is 120 metres for all *Provincially Significant Wetlands* and *other wetlands* greater than 2 ha. The *Area of Interference* for *wetlands* that are less than 2 ha in size and not Provincially Significant is 30 metres.

The *Regulation Limit* is the maximum extent of the following areas:

- *Riverine Hazard Limit*, and
- The 15 metre Allowance, and
- The Wetland Boundary, and
- The *Area of Interference* (30 or 120 metres) adjacent to all *wetlands*.

It is recognized that due to the application of standard Allowances and *Areas of Interference*, the *Regulation Limit* includes lands that may not be natural hazards. It must also be recognized that due to the unpredictability of hazard processes and the variable scale of the information used to identify *hazard lands*, that it is possible that the hazard features extend beyond the Allowances and Areas of Interference mapped. Through the submission of more detailed information about the specific hazard feature and about the *development* proposal, it is anticipated that a more precise extent of the hazard limit will be determined. More detailed information on the hazard limits is found in Appendix 9.1.7, the UTRCA's Reference Manual – Determination of Regulation Limits, March 2006.

2.2.5 Environmental Impact Study (EIS) for Natural Hazard Lands

Development or *site alteration* proposed within a natural hazard feature or within the Allowance or *Area of Interference* may be required to be supported by an *Environmental Impact Study* (EIS). The *EIS* will need to:

- Confirm the extent of the natural hazard feature:
- Identify any potential impact of the *development* or *site alteration* on the hazard feature or hazard processes;
- Identify hazard avoidance or hazard mitigation strategies; and
- Integrate natural heritage, natural resource and/or servicing considerations.

The detailed requirements of an *EIS* will depend on the nature of the proposed *development* or *site alteration* or the specific characteristics of the natural hazard feature and the extent of encroachment on the hazard feature. Minor projects may only require a scoped *EIS*. The factors to be considered for a scoped *EIS* include the extent of the encroachment, the potential impact of the use and the sensitivity of the feature. Major projects involving more complex issues, will likely require a comprehensive *EIS*. The Authority strongly encourages pre-consultation on the requirements of the *EIS.*

2.2.6 Pre-consultation

Prior to submitting their *development* applications and proposals, applicants should meet with Authority Staff so that any issues and concerns can be identified early on in the planning process. At such time, Staff can advise applicants whether the Authority can support the proposed *development*. There may be site conditions and factors that simply will not allow any *development* to occur.

Through the pre-consultation process staff can also advise on:

- the need for technical studies and supporting information that may be required for the review process; and
- the requirement to obtain a permit under the UTRCA's *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation.*..

Development proponents are also encouraged to pre-consult with municipalities and other approval agencies and where applicable, the pre-consultation should occur as a joint meeting.

2.2.7 Specific Natural Hazard Areas

2.2.7.1 Riverine Flood Hazards

2.2.7.1.1 Description of Riverine Flood Hazards

In the case of riverine flood hazards, the Province has established the minimum *Regulatory Flood* Standard to be the *1:100 Year Flood*. Although the 100 Year (1 % risk of occurrence in any given year) is established as the minimum, Conservation Authorities are encouraged to adopt a *Regulatory Flood* Standard for their area of jurisdiction which is in the 1:250 range (0.4 % risk of occurrence in any given year).

The *Regulatory Flood* Standard for the UTRCA is the 1937 *Observed Flood.* The UTRCA received approval from the Minister of Natural Resources to use this standard in an agreement dated 1989 (See Appendix 9.1.3). As previously indicated, the probability of occurrence of the *Regulatory Flood* is calculated to be approximately 1:250. The flood levels for the *Regulatory Flood* are calculated using mathematical models which consider historical stream flow, precipitation, climate, watershed conditions, *watercourse* and *flood plain* characteristics, and flood control systems across the watershed. These mathematical models include HEC II or HEC RAS Flood Plain Modeling.

The UTRCA considers the threshold for Provincial Interest *flooding* to be a 125 hectare drainage *area*. In this regard, the policies for Riverine Flood Hazards that are discussed in this manual are generally only applied to those cases where the *drainage area* of the *watershed* exceeds 125 hectares. *Flooding* from smaller *drainage areas* is generally considered to be local interest *flooding* and the management of these areas is left to the local municipalities. It should be noted that no minimum *drainage area* is applied to erosion hazards, watercourse hazards or *wetlands*.

The UTRCA provides technical assistance to municipalities in dealing with the management of local *flooding* issues. In those cases where the flood flows from a *drainage area* of less than 125 hectares are significant and affect multiple properties, the Authority, in cooperation with the municipality, may apply *flood plain* hazard approaches to those specific *drainage areas.*

2.2.7.1.2 Flood Hazard Management Approaches

The Authority implements various approaches for managing flood risk as follows:

1. **One Zone Policy Approach** whereby the Regulatory *Flood Plain* is considered to be one management unit - the *Floodway*. This approach is typically applied in rural areas and unserviced settlement areas. *Development* and *site alteration* in the *Floodway* is generally prohibited or restricted.

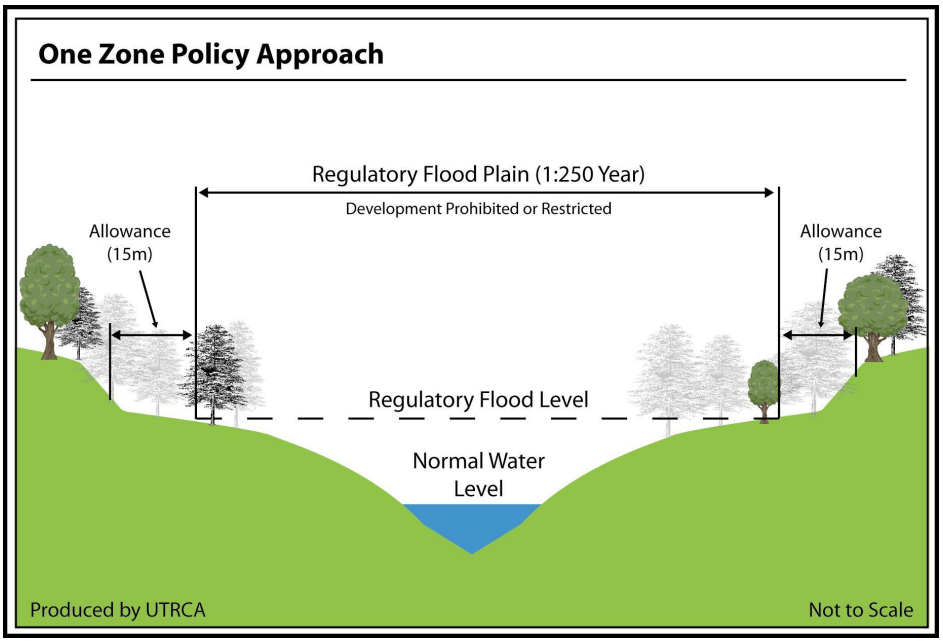

Figure 2-1

2. **Two Zone Policy Approach** is typically applied in serviced urban areas. It separates the *flood plain* into two main components:

   a) The *Floodway*: The portion of the *flood plain* that is characterized by deeper, faster moving water in a flood event. The *floodway* is the more hazardous part of the *flood plain* and *development* and *site alteration* is generally not permitted.

   b) The *Flood Fringe*: The portion of the *flood plain* that is characterized by shallower, slower moving water in a flood event. The *flood fringe* is a less hazardous part of the *flood plain* and *development* and *site alteration* may be permitted in this area subject to satisfying specific conditions.

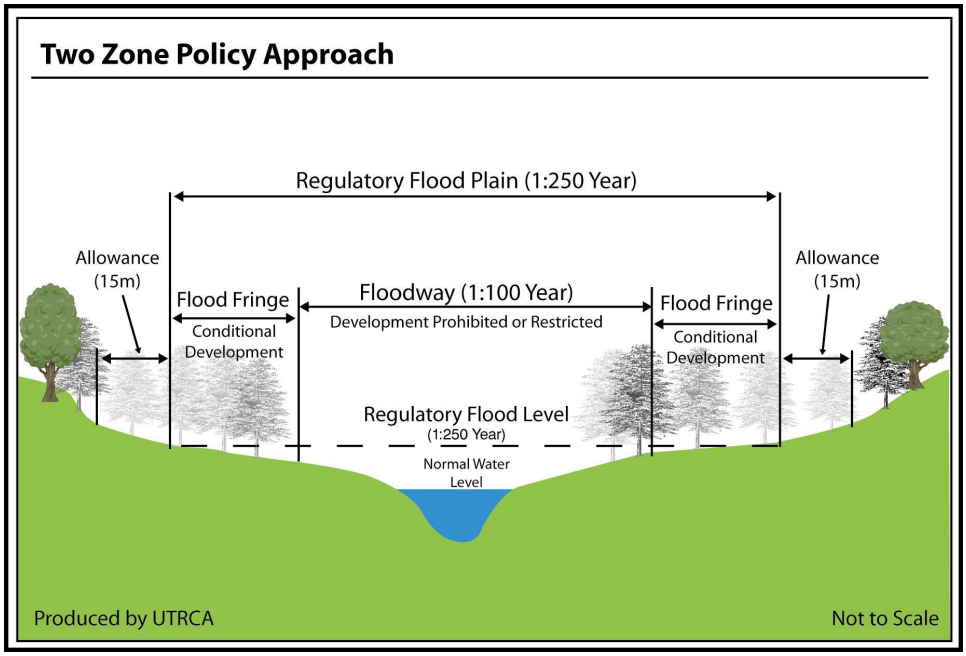

Figure 2-2

3. ***Special Policy Areas*** are specifically identified areas that are not protected to the minimum provincial standard. The area must be a viable community that feasibly cannot be protected from the risk of *flooding*. Through the implementation of a *Special Policy Area,* the Provincial government may permit certain activities that do not meet the minimum Provincial standards. Special Policy Areas must be supported by the Municipality and the Conservation Authority and must be approved by the Ministers of Natural Resources and Municipal Affairs and Housing. Specific policies and considerations that may be established for a *Special Policy Area* include:

   - no basements, *floodproofing* to the maximum
   - no new severances - no new lots
   - no intensification of use
   - preference for residential conversion to commercial type uses
   - no day cares, hospitals, nursing homes etc.

2.2.7.1.3 Riverine Flood Hazards – Determination of Limits

The following requirements are used to identify the limits of riverine flood hazard areas:

1. *Regulatory Flood Plain* – its limit must be delineated to the satisfaction of the UTRCA. The preferred method of delineation is based on detailed *flood plain* mapping calculations which incorporates site specific elevation data and catchment specific flow data and variables. In cases where detailed *flood plain* mapping is not available, the UTRCA reserves the right to require a proponent to determine the *flood plain* limits using a method that is acceptable to the UTRCA.

   Detailed *flood plain* mapping has been completed for many areas of the Upper Thames River *watershed*. The mapping is generally available for urban areas, main branches of the watercourses and local areas where specific studies have been provided. For the remainder of the *watershed*, the UTRCA has prepared estimated flood lines in accordance with the methodologies documented in the Determination of *Regulation Limits*, UTRCA, March 2006 (Appendix 9.1.7). The estimated flood lines are to be used at a broad planning level and depending on the type of *development* or *site alteration* proposed, the Authority may require a detailed *flood plain* calculation to be undertaken.

2. The *Floodway* – In those limited cases where a *Two Zone Policy Approach* is applied, the extent of the *floodway* may be determined using one of the following methods:

   a) The land below the 1:100 Year *Flood Plain* elevation
   b) A detailed hydraulic *floodway* analysis for a logical reach of the subject watercourse

3. *Special Policy Areas* – In those limited cases where a *Special Policy Area* is applicable, the limits of the *Special Policy Area* and policies must be supported by the UTRCA and must be approved by the Municipality, the Ministry of Natural Resources and the Ministry of Municipal Affairs and Housing. In cooperation with the municipality, the UTRCA may identify potential *Special Policy Areas* and implement interim policy requirements for these areas while the formal *Special Policy Area* review and approval process is underway.

2.2.7.1.4 Riverine Flood Hazards – Allowance

A 15 metre Allowance is applied to Riverine Flood Hazards.

2.2.7.2 Riverine Erosion Hazards

2.2.7.2.1 Riverine Erosion Hazards - Description

Erosion is a natural process which can pose a risk to life and property and cause social disruption. The natural movement of *watercourses* and valley slopes due to *erosion* can be aggravated by human activities and the impact of the activity can be transferred some distance from the impact site. The risk of *erosion* is managed by planning for the 100 *year erosion rate* (the average annual rate of recession extended over a one hundred year time span). The extent of the riverine erosion hazard limit depends on whether the *erosion* is occurring in an *Apparent System* (e.g. well defined valley system) or whether it is a *not apparent system* (e.g. relatively flat landscape that is not confined or bound by valley walls). In keeping with the hazard avoidance approach of the UTRCA, *development* and *site alteration* is generally not permitted in riverine erosion hazard areas.

2.2.7.2.2 Riverine Erosion Hazards – Determination of Limits

The UTRCA has prepared mapping which establishes the location of riverine erosion hazards at a planning area level of detail. The UTRCA mapping incorporates detailed *erosion* information for those areas where it is available along with general methodologies that are consistent with Provincial Technical guidelines. More specific information on the mapping of slopes is available in the Determination of *Regulation Limit*s, UTRCA, March 2006 (Appendix 9.1.7). The UTRCA reserves the right to require a detailed assessment of riverine erosion hazards as a prerequisite for reviewing any *development* or *site alteration* proposal and any such assessment must be undertaken with regard for Provincial Technical guidelines and follow accepted engineering practices to the satisfaction of the UTRCA.

1. The Riverine Erosion Hazard Limit for *Apparent Systems* is comprised of the combined effect of the following:

    a) *Valley Top of Slope* – In cases where valley slopes are found to be at a stable angle, and not subject to the potential influence of toe erosion, the *Valley Top of Slope* is the riverine erosion hazard limit. The *Valley Top of Slope* is located at the break in slope point between the valley side slope and the tableland.

    b) *Toe Erosion Allowance* – In cases where there is a potential for erosion at the toe of the slope from natural processes, the riverine erosion hazard limit needs to be shifted to account for the influence of toe erosion.

    c) *Stable Slope Allowance* – In cases where a slope is steeper than its determined stable angle of repose, the riverine erosion hazard limit needs to be shifted to account for slope movement over time. In the absence of detailed geotechnical information about the slope, the *stable slope* allowance is based on an assumed *stable slope* gradient of 3 horizontal units to 1 vertical unit (3:1). For slopes having a steeper gradient, the allowance is equal to the distance between the

actual *valley top of slope* and the point at which a slope at a 3:1 gradient, rising from the same toe position, would intersect the ground surface.

d) Erosion Access Allowance – a six metre allowance added to the Valley Top of Slope or the combined Toe Erosion and Stable Slope Allowances. The *erosion access allowance is required f*or the purpose of maintaining sufficient *access* for emergencies, maintenance, and construction activities.

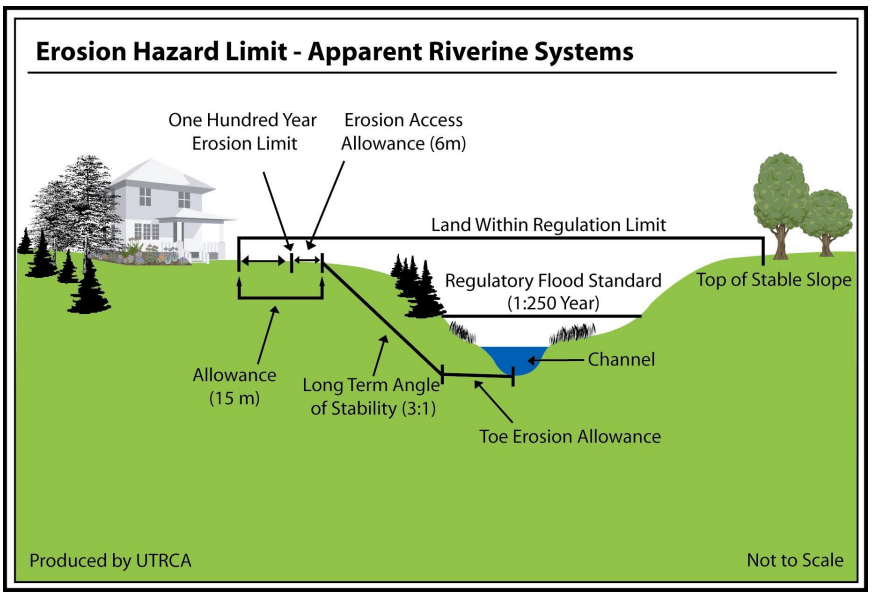

Figure 2-3

2. The Riverine Erosion Hazard Limit for *Not Apparent Systems* is the combined limit of:
   a) The *Meander Belt Allowance* which provides a limit to *development* within those areas where the river system is likely to shift. It is based on twenty (20) times the bankfull channel width.

   b) *The Erosion Access Allowance – a six metre allowance added to the Valley Top of Slope or the combined Toe Erosion and Stable Slope Allowances. The erosion access allowance is required f*or the purpose of maintaining sufficient *access* for emergencies, maintenance, and construction activities.

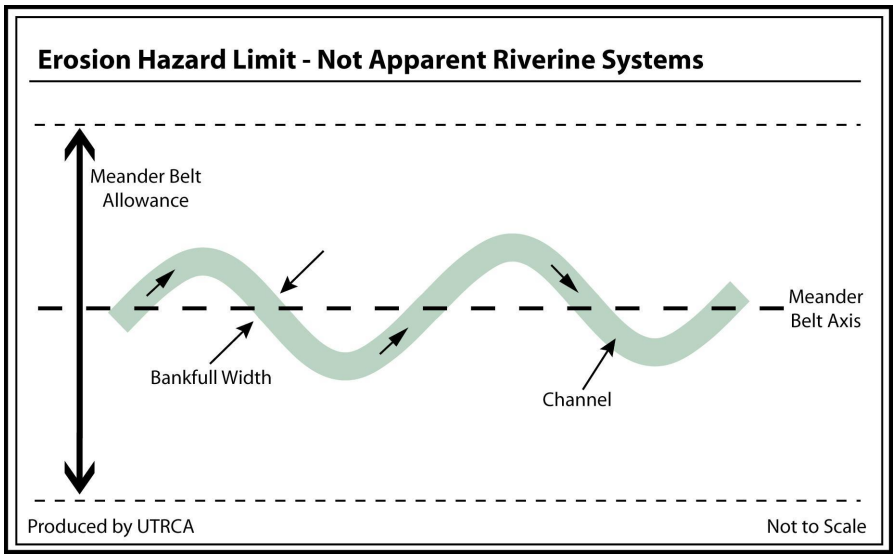

Figure 2-4

2.2.7.2.3 Riverine Erosion Hazard Allowance

A 15 metre Allowance is applied to Riverine Erosion Hazards.

2.2.7.3 Watercourses

2.2.7.3.1 Watercourses - Description

In accordance with Section 28(25) of the Conservation Authorities Act, a "watercourse" means an identifiable depression in the ground in which a flow of water regularly or continuously occurs. This may include rivers, stream creeks, ditches and municipal drains. Watercourses may be natural or they may be man made as is the case with open municipal drains. Watercourses play a critical role in the drainage of the landscape and any interference with a watercourse could have significant implications for *flooding* and *erosion* at the site of interference and for some distance upstream and downstream.

2.2.7.3.2 Watercourses – Determination of Limits

The UTRCA mapping of the *Regulation Limit* shows the location of watercourses at a planning area level of detail. Site specific information on the exact location and characteristics of a watercourse may be required as a prerequisite in reviewing any proposed *development* or *site alteration* in close proximity to a *watercourse*. The UTRCA considers open man-made channels and municipal or private drains to be watercourses.

2.2.7.3.3 Watercourses – Allowance

A 15 metre Allowance is applied on both sides of all watercourses.

2.2.7.4 Wetlands

2.2.7.4.1 Wetlands - Description

Wetlands are addressed in the *natural hazards* and natural heritage sections of this manual. The specific definition for *Wetlands* is provided in the glossary. From a *natural hazard* perspective, the following functions and characteristics of *wetlands* are considered:

- flood storage, flood level and flow augmentation
- source area
- recharge area
- potential standing water or for the presence of organic soils (peat and muck)

Filling or draining can have an impact on the hydrologic functions of a *wetland* which in turn, may influence the *flooding* and *erosion* processes in the area. While it may be argued that the impact of *wetland* draining or filling in local areas is difficult to quantify, it is certain that the incremental impact of widespread *wetland* interference can have a significant impact on downstream hydrology.

2.2.7.4.2 Wetlands – Determination of Limits

The UTRCA has identified *wetland* areas in the *Regulation Limit* mapping. Identified *wetland* areas include those areas which were evaluated using the Ontario Wetland Evaluation System, 3RD Edition (MNR, 1994) and unevaluated *wetlands* derived from a combination of information sources. Specifics about the mapping methodologies can be found in the Authority's Determination of Regulation Limits, UTRCA, March, 2006 (Appendix 9.1.7).

The UTRCA reserves the right to require the proponent to submit a detailed *wetland* boundary determination consistent with the Ontario Wetland Evaluation System, 3RD Edition (MNR, 1994) or other methodology acceptable to the UTRCA. It is noted that the revision of a *wetland* boundary may require the approval of the MNR.

2.2.7.4.3 Wetlands – Area of Interference

Wetlands can be impacted by *development* and *site alteration* that is located outside of the wetland boundary. To address this concern, an *Area of Interference* is established around all *wetland*s in order to identify those lands which if developed could potentially have a negative impact on the *wetland*. The width of the actual *Area of Interference* will differ for each situation because it is based on a site by site assessment having regard for both the characteristics of the *wetland* and for the specifics of the proposed *development* or *site alteration*.

Consistent with the Provincial standards, and to ensure *wetland* protection, a standard *Area of Interference* has been applied to mapping of *wetlands* at a planning level. The *Area of Interference* for all *Provincially Significant Wetlands* and all *other wetlands* greater than 2 hectares is 120 metres. An *Area of Interference* of 30 metres is applied to all mapped *wetlands* that are less than 2 hectares in size and not Provincially *Significant*.

The term *Area of Interference* of a *wetland* is a term that applies to planning for *wetlands* as natural hazards. *Adjacent Lands* are identified around *wetlands* for natural heritage purposes. It should be noted that the extent of *adjacent lands* is not always consistent with the extent of *Area of Interference*.

2.3 NATURAL HERITAGE

2.3.1 Natural Heritage Planning

Planning for natural heritage resources involves making decisions for the plant and animal communities that are found on the landscape. All natural heritage planning is based on the underlying principle that *biodiversity* which includes both the number of species and the generic diversity within species is the key indicator of *ecosystem* health. In terms of land use management for natural heritage, decisions are often based on maintaining and enhancing the *biodiversity* of vegetative *habitat* so that it can support a diversity of animal populations. Natural heritage resources include *wetlands*, *woodlands*, threatened and *endangered species* (and their *habitat*), Wildlife (and their habitat) and fish (and their *habitat*).

2.3.2 Goals & Objectives

1. To protect *natural heritage features* and systems from the potentially negative impacts of *development* and *site alteration*.

2. To maintain, restore and enhance the bio-diversity, ecological function and connectivity of *natural heritage features* and systems in the *watershed*.

2.3.3 Guiding Principles

- Decisions for natural heritage will be guided by an integrated systems approach;
- *Development* and *site alteration* will maintain or enhance natural heritage resources;
- The potential for *cumulative effects* from individual *development* and *site alteration* must be anticipated and in this regard, a precautionary approach is taken when reviewing proposals.

2.3.4 Natural Heritage Features Overview

Wetlands, woodlands, prairies, shrub lands, thicket, *valleylands, oil fields* and *watercourses* are *natural heritage features* which provide *habitat* for wildlife and contribute to our well being by providing opportunities for recreation, leisure and nature appreciation. These features are interrelated within the *ecosystem* and as a result, alterations to one feature likely will impact another.

The preferred approach for defining the limits or boundaries of *natural heritage features* is through local science based studies such as The Middlesex Natural Heritage Study. However, in the absence of a local comprehensive assessment and locally determined criteria, the Authority shall rely on the most current provincial Natural Heritage Training Manual and any updates thereto as well as information that is available from the Natural Heritage Information Centre or NHIC.

2.3.5 Environmental Impact Study (EIS) for Natural Heritage

Development or *site alteration* proposed within a natural heritage feature or within the *adjacent lands* needs to be supported by an *Environmental Impact Study* (*EIS*). The *EIS* must:

- Confirm the extent of the natural heritage feature and the relationship of the specific feature to other features in the area;
- Confirm the significance of the feature;
- Identify any potential impact of the *development* or *site alteration* on the natural heritage feature or natural heritage functions;
- Identify avoidance and mitigation strategies; and
- Integrate natural hazard, natural resource and/or servicing considerations

The detailed requirements of an *EIS* will depend on the proposed *development* or *site alteration* or the specific characteristics of the natural heritage feature and the extent of encroachment on the feature. Minor projects may only require a scoped *EIS*. The factors to be considered for a scoped *EIS* include the extent of the encroachment, the potential impact of the use and the sensitivity of the feature. Major projects involving

more complex issues, will likely require a comprehensive *EIS*. Pre-consultation on the requirements of the *EIS* is strongly encouraged.

A description of the *watershed*'s *natural heritage features*, including how their boundaries or limits are defined is provided. It is noted that it is difficult to draw boundaries around natural features because they are dynamic and always in a state of transition.

2.3.6 Pre-consultation

Applicants are should meet with Authority Staff prior to submitting their *development* applications and proposals so that any issues and concerns can be identified early on. At such time, Staff can advise applicants whether the Authority can even support the proposed *development*. There may be site conditions and factors that simply will not allow any *development* to occur.

Through the pre-consultation process staff can also advise on:

- The need for technical studies and supporting information that may be required for the review process; and
- the requirement to obtain a permit under the UTRCA's *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation*.

2.3.7 Natural Heritage Features

2.3.7.1 Wetlands

2.3.7.1.1 Wetlands - Description

*Wetland*s are addressed in both the *natural hazards* and natural heritage sections of this manual. *Wetland*s are areas that are seasonally or permanently *flooded* by shallow water, as well as areas where the water table is close to the surface. They are found in both terrestrial and aquatic *ecosystems* and include swamps, marshes, bogs and fens. A definition for *wetland*s is included in the glossary. From a natural heritage perspective, *wetland*s directly provide *habitat* for various species and many species indirectly benefit from the hydrologic functions that *wetland*s provide such as flow augmentation, recharge and discharge.

2.3.7.1.2 Wetlands – Determination of Limits

The UTRCA has identified *wetland* areas in the *Regulation Limit* mapping. The areas identified as *wetland* include areas that have been evaluated using the Ontario Wetland Evaluation System, 3RD Edition (MNR, 1994) and unevaluated *wetland*s derived from a combination of information sources. Specifics about the mapping methodologies can be found in the Determination of Regulation Limits, UTRCA, March 2006 (Appendix 9.1.7).

The Ontario Wetland Evaluation System allows for the identification of some *wetlands* as being Provincially *Significant*. All *other wetlands*, whether they have been assessed under the Evaluation System or not, are considered to be of local significance. The UTRCA reserves the right to require the proponent to submit a detailed wetland evaluation consistent with the Ontario Wetland Evaluation System or other methodology acceptable to the UTRCA. It is noted that the revision of any wetland boundary or *wetland* classification may require the approval of the MNR.

2.3.7.1.3 Wetlands – Adjacent Lands

The *adjacent lands* for *Provincially Significant Wetlands* is 120 metres. For all *other wetlands*, the *adjacent lands* is 50 metres.

It is noted that *adjacent lands* is the term applied to the planning for *wetlands* as *natural heritage features whereas a*n *Area of Interference* is applied around *wetlands* for Natural Hazard purposes. The extent of *adjacent lands* is not always consistent with the extent of *Area of Interference*.

2.3.7.2 Woodlands

2.3.7.2.1 Woodlands - Description

Woodlands, some of which are also *wetlands*, fulfill many functions, including:

- protecting and building the soil (humus layer);
- producing oxygen and taking up pollutants;
- moderating the climate;
- protecting *groundwater*;
- providing *habitat* for game and other wildlife:
- providing products such as fuel wood, timber and maple syrup;
- providing areas for recreation and education;
- contributing to the function and integrity of the ecosystem;
- water absorption during storms; and
- contributing to our natural heritage.

Woodlands are treed areas that provide environmental and economic benefits such as *erosion* prevention, water retention, provision of habitat, recreation and the sustainable harvest of woodland products. The *watershed's Woodlands* can range from natural,

native mixed forests to monoculture plantations to canopy trees with manicured lawns below. While natural mixed *woodlands* with fully functional canopy, mid-storey and ground cover vegetation are preferred from an ecological point of view, other types of *woodlands* and individual trees can provide important linkages or complementary *habitat* functions.

2.3.7.2.2 Woodlands – Determination of Limits

The Authority prefers that woodland significance be determined as part of a comprehensive study of the natural heritage system for the planning area. In the absence of such a study, the following factors from the MNR Natural Heritage Technical Manual are considered:

- Size;
- Shape;
- Proximity to other *woodlands* or *natural heritage features*;
- Linkage functions;
- Uncommon characteristics; and
- Diversity and management value.

The specific requirement for each of the factors will depend on the general characteristics of the natural heritage found in the planning area. *Woodlands* that meet one or more factors are considered to be significant in the planning area.

2.3.7.2.3 Woodlands – Adjacent Lands

The *adjacent lands* for *woodlands* is 50 metres.

2.3.7.3 Valleylands

2.3.7.3.1 Valleylands - Description

Valleylands are linear systems that provide important linkages between different *habitat* features. *Valleylands* are often associated with riverine flood or erosion hazard areas. All *valleylands* are considered to be *significant*.

2.3.7.3.2 Valleylands – Determination of Limits

The minimum limit of the *valleyland* is determined by the methodology used to map the Riverine Erosion Hazard Limit for *Apparent Systems* as described in Section 2.2.7.2.2 of this manual. The *valleyland* limit may be expanded to include connecting areas such as *not apparent systems* to make the *valleyland* continuous. Contiguous natural heritage areas which extend out of the valley may also be considered for addition to the *valleyland system*.

2.3.7.3.3 Valleylands – Adjacent Lands

The *adjacent lands* for all *valleylands* is 50 metres.

2.3.7.4 Wildlife Habitat

2.3.7.4.1 Wildlife Habitat - Description

A considerable amount of *wildlife habitat* has been degraded or lost in the Upper Thames *watershed*. Much of this loss is attributed to the *fragmentation* of wooded areas due to urban *development* and the clearing of land for agricultural production. *Wetland*, prairie, savannah and mature hedge rows have also been lost. The provision of *habitat* is a primary ecological function of *natural heritage features and areas*. Ultimately, the loss of habit will lead to the loss of the species that rely on these features.

2.3.7.4.2 Wildlife Habitat – Determination of Limits

The Authority prefers that *wildlife habitat* significance be determined as part of a comprehensive study of the natural heritage system for the planning area. In the absence of such of a comprehensive study, the following factors are considered when evaluating *wildlife habitat*:

- Seasonal concentrations of animals;
- Rare vegetation communities and/or specialized *habitats* for wildlife; and
- Wildlife movement corridors.

Authority staff will rely on the *Significant* Wildlife Habitat Technical Guide (MNR, 2000) to determine the limits of *wildlife habitat*.

2.3.7.4.3 Wildlife Habitat – Adjacent Lands

The *adjacent lands* for *wildlife habitat* is 50 metres.

2.3.7.5 Habitat of Endangered, Threatened, Species of Special Concern & Locally Rare Species

2.3.7.5.1 Habitat of Endangered, Threatened, Species of Special Concern & Locally Rare Species - Description

Any plant or animal which is threatened by, or vulnerable to, extinction is considered to be a species at risk. In the absence of Authority listings for *endangered and threatened species*, Authority Staff shall consult with the Ontario Ministry of Natural resources list of Species at Risk in the province www.ontarioparks.com/english/sar.html and the Federal list of Species at Risk in Ontario.

The natural areas in the *watershed* play an important role in preserving the province's and the country's *endangered species, threatened species*, species of *special concern* as well as locally rare species. The loss of habitat is a major factor that influences the survival of species. Increased pressures from urban and rural land uses and human activities are impacting the habitat of flora and fauna in the Upper Thames River *watershed*. An Ecosystem Recovery Plan has been initiated for the Thames River and pertinent findings of the Ecosystem Recovery Plan will be incorporated into this policy manual as they become available.

2.3.7.5.2 Habitat of Endangered, Threatened, Species of Special Concern & Locally Rare Species – Determination of Limits

The extent and location of the habitat of species at risk may be identified through local comprehensive natural heritage studies, site specific inventories and/ or an EIS. These habitat evaluations are then reviewed and approved by the Ministry of Natural Resources. General information on the location of Species at Risk may also be available from the MNR Natural Heritage Resource Information Centre.

2.3.7.5.3 Habitat of Endangered, Threatened, Species of Special Concern & Locally Rare Species – Adjacent Lands

The *adjacent lands* for the habitat of endangered, threatened, species of *special concern* and locally rare species is 50 metres. It is possible that the size of the *adjacent lands* may be increased based on the significance and/or necessity of the species on a case by case basis.

2.3.7.6 Aquatic Ecosystem Habitat & Fish Habitat

2.3.7.6.1 Aquatic Ecosystem Habitat & Fish Habitat - Description

The aquatic ecosystem of the Thames River and its tributaries refers to connected *watercourses* (streams, rivers, creeks, ditches, swales and municipal drains), waterbodies (lakes and ponds), and *wetlands*. These features provide habitat for all life stages for aquatic species, and specific life stages for semi-aquatic species. Included are corridors for movement, food for sustenance, cover for protection, and habitat for reproduction and the raising of young. Fish Habitat includes the spawning grounds and nursery, food supply and migration areas which fish rely on to live.

Over the last century, human activities in the *watershed* have impacted the surface water quality of the Thames River. Some of the *pollution* sources that are impacting the water quality in the *watershed* include improper sewage treatment plant discharges, industrial discharges as well as urban and agricultural runoff. Land use and the application of *best management practices* largely influence water quality parameters such as temperatures, chemical composition and pollutants, and nutrient and sediment loads. While great strides have been made to improve the surface water quality in the *watershed*, much work is still needed.

There is a variety of federal and provincial legislation that addresses the components of the aquatic *ecosystems* that Authority Staff have regard for when evaluating *development* applications. Through its Watershed Report Cards which are updated every 5 years, Authority Staff continue to study and monitor water quality and make recommendations regarding the protection of surface water. The Authority is also involved with a province-wide initiative for *Source Water Protection* planning which will include an evaluation of surface water sources.

2.3.7.6.2 Aquatic Ecosystem Habitat & Fish Habitat - Determination of Limits

The criteria to identify aquatic ecosystem habitat and their locations is determined by local comprehensive studies.

2.3.7.6.3 Aquatic Ecosystem Habitat & Fish Habitat – Adjacent Lands

The *adjacent lands* for *fish habitat* is located within 30 metres of the habitat. It is possible that the size of the *adjacent lands* may be increased based on the significance and/or necessity of the species on a case by case basis.

2.3.7.7 Areas of Natural & Scientific Interest (Life Science)

2.3.7.7.1 Areas of Natural & Scientific Interest (Life Science) - Description

Areas of Natural and Scientific Interest (*ANSI*s) include lands and water that have natural features or landscapes containing life or earth science values that should be protected for science and education purposes. *ANSIs* have an important role in the protection of natural heritage because they represent the full range of biological communities, environments and natural landforms in the province. In terms of natural heritage planning, the UTRCA focuses on Life Science *ANSIs*.

Life science *ANSIs* may include forests, valleys, prairies and *wetlands* including their native plants, animals and supporting environments. They tend to correspond with other *significant* features like *wetlands, woodlands* and *valleylands*. The MNR is responsible for determining if a life science *ANSI* is considered to be *significant*.

2.3.7.7.2 Areas of Natural & Scientific Interest (Life Science) – Determination of Limits

The limits of Life Science *ANSI*'s are determined by the MNR.

2.3.7.7.3 Areas of Natural & Scientific Interest (Life Science) – Adjacent Lands

The *adjacent lands* for Life Science *ANSIs* is 50 metres.

2.4 NATURAL RESOURCES

2.4.1 Natural Resource Planning

An integrated approach is needed when evaluating the *watershed's* natural resources which include *groundwater*, aggregates and agricultural lands. These resources are all connected to the hydrologic cycle and therefore have an impact on the water quality and quantity in the *watershed* as well as the entire *ecosystems*.

2.4.2 Goals & Objectives

1. To ensure that the natural resources of the *watershed* are protected over the long term.

2.4.3 Guiding Principles

- The Authority encourages and promotes the conservation and wise management of natural resources in its efforts to protect the environmental quality of the *watershed* over the long term.

2.4.4 Natural Resources in the Watershed

2.4.4.1 Groundwater

Across Ontario, increasing demands for safe dinking water and requirements to maintain healthy *ecosystems* are leading to renewed interest in water management. The UTRCA requires scientific assessments of the potential for *groundwater* resources to become contaminated from anthropogenic, as well as natural sources of contamination. Trade offs must be carefully considered among the competing influences of study cost, scientific defensibility and the amount of acceptable uncertainty.

Within the *watershed*, *groundwater* is the sole source of drinking water for many urban communities and virtually all rural residents. It is also an essential part of the *ecosystem* because of its strong linkages with streams, rivers and lakes. *Groundwater* comprises the major portion of stream/river flow during summer low flow conditions. There are several factors that can impact *groundwater* quality including nutrient contamination from livestock, industrial impacts and private septic systems to name a few.

A more thorough understanding of groundwater recharge areas, the susceptibility of *groundwater* to contamination and a strategy to ensure a safe and secure water resource for the future is needed. These issues and concerns will be addressed through *Source Water Protection* Planning which as previously noted, is a province-wide initiative that the Upper Thames River Conservation Authority is participating in. It is anticipated that the process will lead to the preparation of strategies to protect drinking water from the source to the tap. Protecting water at the source is the first barrier in a multi-barrier approach in protecting surface and groundwater resources.

2.4.4.2 Aggregate Resources

Aggregate is a non-renewable resource that must be managed effectively. It includes any material prescribed under the Aggregate Resources Act such as sand, gravel, clay and bedrock as well as stone used in cement, lime or clay bricks or tiles. There are a number of areas within the Upper Thames River *watershed* that are endowed with substantial aggregate resources. These resources play an important part of aggregate production in Southwestern Ontario as well as in local economies.

Aggregates deposits are a key element of the *watershed*'s hydrologic cycle as they provide *groundwater* recharge and discharge zones.

2.4.4.3 Agricultural Lands

As previously noted, agriculture is the predominant land use in the Upper Thames *watershed*. Surface water and *groundwater* quality may be impacted by farm practices and agricultural run off which may contain livestock manure, pesticides, fertilizers and milkhouse wastewater. Municipal drains are a common feature across the agricultural landscape and also can have an impact on the hydrologic cycle.

2.5 SERVICING & MITIGATION

2.5.1 Planning for Services

Land *development* typically involves a change in land use which requires the implementation of municipal services such as stormwater management facilities, road construction, and sanitary sewers. The installation of these services can considerably alter the natural drainage patterns of the landscape and can have serious negative impacts on the hydrologic cycle and the *ecosystem*.

The Authority's review of *development* proposals and proposed servicing strategies prior to construction ensures that the natural hazard, natural heritage, and natural resource components are not negatively impacted. This review includes any permanent alteration to local drainage patterns and considers the capacity of the *watercourse* and its physical and natural characteristics. It also includes any temporary or permanent facilities which are to be constructed and maintained to reduce sediment loss by *erosion*.

2.5.2 Goals & Objectives

1. To effectively mitigate the impacts of land *development* and servicing.

2. To protect the *watershed* from potentially harmful impacts associated with land *development* and the installation of services including roads, sewers and stormwater management facilities.

2.5.3 Guiding Principles

- The Authority supports the preparation of Watershed and Subwatershed Management Plans which provide a comprehensive systems approach for assessing and addressing the impacts of services within a defined planning area or community on *natural hazards*, *natural heritage features* and natural resources. These Plans should logically be undertaken at a catchment or collection of catchments level.

- Some adjustment may be required in the preparation of watershed and subwatershed management plans to recognize those areas where urban expansions or community planning areas may not logically follow catchments.

- Natural designs for stormwater management are supported.

2.6 INTEGRATED RESOURCES & SYSTEMS PLANNING

The *watershed* is an integrated system of human and natural resources and processes that need to be managed in a holistic and balanced way in order to achieve a healthy sustainable *ecosystem*. The policies contained in this Manual support the UTRCA's integrated, comprehensive and long-term approach to planning and recognize and respect the linkages among the *watershed*'s resources and systems. The policies also have regard for the potential for *cumulative effects* of the decisions that are made through the Authority's planning advisory and regulatory services.

The Authority's approach to integrated resources planning is consistent with the direction provided by the PPS which recognizes the linkages between the policies for natural hazard, natural heritage and natural resource features and advocates the *watershed* as the "ecologically meaningful scale" for planning. Keeping this in mind, all of the policies in the manual should be considered when reviewing *development* proposals.

2.6.1 Goals & Objectives

1. To protect and enhance the resources and processes and their linkages which are needed to achieve a healthy *ecosystem*.

2. To consider the potential impact of decisions on all of the components and features that together form the integrated *watershed* system including *natural hazards*, natural heritage, natural resources and servicing.

2.6.2 Guiding Principles

- The Authority advocates an integrated approach to planning and managing the *natural hazards*, *natural heritage features* and systems, natural resources and servicing within the *watershed*.

- The Authority supports that decisions be guided by comprehensive studies of natural hazard, natural heritage and natural resource features and processes on appropriate management scales.

- The potential for cumulative impacts must always be considered and even in cases where the impact is considered to be minor, a precautionary approach needs to be taken.