

## Process to update the Water Withdrawal Assessment Process and Screening Tool

The purpose of this document is to review the statutes and original documents creating the Water Withdrawal Assessment Process and Screening Tool to find guidance regarding the appropriate processes necessary to modify the overall process or tool. The Michigan law PA34 of 2006 reconstituted the Groundwater Conservation Advisory Council and among other things required it to:

- design and make recommendations regarding a water withdrawal assessment tool

Furthermore, the Council was required to consult with a technical advisory group it would form and with MDEQ, MDNR, and Michigan Department of Agriculture (MDA) to do all the following:

- design a water withdrawal assessment tool that can be utilized to protect and conserve the Waters of the State and the Water-dependent Natural Resources of the State. The water withdrawal assessment tool shall be designed to be used by a person proposing a new or increased Large Quantity Withdrawal to assist in determining whether the proposed withdrawal may cause an adverse impact to the Waters of the State or to the Water dependent Natural Resources of the State;
- make factually based recommendations for the policy-based parameters and variables of the water withdrawal assessment tool; and
- recommend an appropriate timetable for periodic updates or changes to the water withdrawal assessment tool or to the water withdrawal assessment tool's parameters or variables.

The authorizing statute clearly anticipated that there would be periodic updates and changes. The Council's July 2007 "Report to the Michigan Legislature in response to 2006 Public Act 34" recommended the overarching policies that form the Water Withdrawal Assessment Process (Process), and the detailed models that embody many of the policies and allow automated authorization of most large quantity water withdrawals through the Screening Tool or Water Withdrawal Assessment Tool (WWAT). The report recognized updates are needed to account for new data, refined or redefined models, and future changes in the Process. Some updates are built into the daily operation of the models and Screening Tool. Other updates may improve the accuracy of Screening Tool calculations over time, but are not necessary for ongoing use of the model. For instance, as new geological information becomes available over a period of many years, the Withdrawal Model can be updated with newer aquifer properties that will improve the accuracy of Screening Tool calculations. A summary of the Council's recommendations "Updating Impact Assessment Models" is attached.

The enabling statute that created the Process and Screening Tool relied on and referred to the Council's 2007 report. The statutory language is found in the Natural Resources and Environmental Protection Act PA451 of 1994, Part 327 Great Lakes Preservation. The next

section of this paper reviews statutory language pertinent to key components of the Process and how they might be revised or updated.

<b>Definitions – Section 32701</b>	
<i>Adverse Resource Impact</i> (ARI) defined. Refers to: thriving fish curve, characteristic fish curve, index flow, and baseline capacity	Fixed by law. (Requires new law to change.)
<i>Baseline capacity</i> defined.	Fixed by law.
<i>Fish curves</i> are referenced from the GWCAC July 2007 report.	Fixed by law.
<i>Stream types</i> each have a narrative definition and “as determined by a scientific methodology adopted by the commission [NRC].”	Can be updated.
<i>Flow based safety factor</i> defined as half of index flow.	Fixed by law.
Index flow defined, calculated as of October 1, 2008. Value determined by calculation and stream gage records.	Date fixed by law. Value regularly updated.
<i>Site specific review</i> defined as department independent review.	Department discretion.
<i>Zone withdrawals</i> defined as percent reduction on fish curves.	Fixed by law.

<b>Water Withdrawal Assessment Tool – Section 32706a</b>	
WWAT is based on recommendations from the GWCAC and requirements of the part.	The Process is fundamentally linked to the Council recommendations.
The WWAT shall: <ul style="list-style-type: none"> <li>• include safety factor</li> <li>• calculate zones</li> <li>• account for cumulative withdrawals</li> <li>• determine if likely ARI</li> <li>• follow rules for drainage areas of water management areas</li> <li>• work in conjunction with registration process</li> </ul>	
The department shall add verified data to the WWAT’s database and shall consider actual stream or river flow data in conducting a site-specific review.	There is an expectation to add new data.
The department shall make technical modifications to the WWAT related to temperature, hydrology, and flow based on scientific methodology adopted by NRC order.	There is an expectation to make technical modifications.
A person may petition the NRC for redesignation of a stream or river.	Stream type can be changed.
The department shall develop a protocol for collection of streamflow by others (section 32706d).	Expectation to add data.
The department shall determine if an ARI would be caused by cumulative withdrawals (section 32706e).	

The following are quotes taken from the GWCAC July 2007 report (referenced in the enabling statute) regarding the expectations to periodically update the WWAT and underlying models.

Page 2	One of the assignments from the legislature was to recommend an appropriate timetable for periodic updates or changes to the WWAT.
Page 20	Regarding return flow – it should be an explicit part of the process. Future improvements of the screening tool should allow for incorporation of return flow. Return flows should be accounted for in tracking index flows. Return flows should be part of the SSR.
Page 20	Further study is required to consider “capacity” vs. actual water use.
Pages 21-22	Updating models – see attachment.
Page 25	This work must be made adaptable and allowed to continuously develop through time.

An earlier iteration of the council made recommendations for review and approval processes for five types of change in its December 12, 2014 final report. The department has been following this guidance (attached Table TU-1). We are working on several changes to the Process and Screening Tool, the activities and considerations for approval are discussed below.

**Activities undertaken by the Models Committee  
and discussion of the necessary approval process for the final products**

**I. Improvements**

- a. Add columns to the WWAT SQL database table ‘dbo\_account’ that identify if the Index Flow has been reviewed for a Water Management Area (WMA) under an SSR, and the revised Index Flow, if applicable. Also update the WWAT to display this information to the user.

Discussion: There is no change to the function or operation, it just improves efficiency and adds transparency. This is an administrative update, no special approvals needed. We are passing this through the Council process.

- b. Identify geographic areas where we have enough information to justify using a different storage coefficient in the Tool. An example is in western Ottawa County, where the storage coefficient is likely significantly higher than the 0.01 used statewide currently. Also update the WWAT to display the aquifer properties used and where updates to this information have occurred.

Discussion: This will be a technical refinement where data shows it is appropriate. No statutory changes are needed, Council approval appears to be appropriate.

- c. Update the statewide transmissivity and hydraulic conductivity interpolations used in the WWAT.

Discussion: This will be a technical refinement where data shows it is appropriate. No statutory changes are needed, Council approval appears to be appropriate.

- d. Update the WWAT to display registrations and SSR results on the map.

Discussion: There is no change to the function or operation, it just improves efficiency and adds transparency. This is an administrative update, no special approvals needed. We are passing this through the Council process.

### III. Incorporate information from calibrated numerical models into WWAT

- a. Incorporate streamflow depletion estimates from applicably calibrated numerical groundwater models into the WWAT. Numerical groundwater models exist for several regions in the state. Many of these models are capable of producing reasonable streamflow depletion estimates.

Discussion: This is an improvement and refinement to incorporate more specific, scientifically sound information. It is consistent with the July 2007 recommendations; no statutory changes are needed. We suggest Council approval.

Drafted by:  
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## UPDATING IMPACT ASSESSMENT MODELS

In 2006 PA 34, the Council is directed to recommend an appropriate timetable for periodic updates or changes to the water withdrawal assessment tool or to the water withdrawal assessment tool's parameters or variables. Updates are needed to account for new data, refined or redefined models, and future changes in the process. Some updates are necessary for the Impact Assessment Model and the Screening Tool to continue to function as part of the Water Withdrawal Assessment Process. For instance, new authorized withdrawals need to be accounted for in the calculation of available streamflow for that stream segment. Such updates need to be relatively frequent and ongoing. Other updates may improve the accuracy of Screening Tool calculations over time, but are not necessary for ongoing use of the model. For instance, as new geological information becomes available over a period of many years, the Withdrawal Model can be updated with newer aquifer properties that will improve the accuracy of Screening Tool calculations.

Many of the Impact Assessment Model components that need updating can only be described in fairly technical terms. Therefore the Council has detailed these updates in a separate document, Recommended Updates to the Impact Assessment Model, available at <http://www.michigan.gov/wateruse>. **The Council recommends that MDEQ ensures updates are made consistent with this document. A brief summary follows.**

### *Streamflow Model*

- Update and revise statistical models and Index Flow estimates every 5 years.
- Design a sampling scheme for placement of additional long-term stream gages and for collecting miscellaneous flow measurements to improve flow estimates.

### *Withdrawal Model*

- Update groundwater/surface water depletion models every 5 years.
- Define a strategic research program aimed at more accurately representing the groundwater/ surface water interaction.
- Develop and maintain a comprehensive suite of databases and internet-based delivery tools incorporating the PA 148 (GWIM) work, water withdrawal reporting databases, and the water withdrawal Screening Tool.
- Design and implement a statewide groundwater monitoring network to assess changes over time.
- Follow recommendations from Council's 2006 report regarding updating GWIM

### *Fish Community Model*

- Update fish population models and flow-response curves every 5 years.
- Improve approach to modeling physical habitat responses to flow removals.
- Consider impacts of flow reduction on other riverine biota.
- Describe variation (uncertainty) in fish population response by rivers within a given type.

From: **Report to the Michigan Legislature in response to 2006 Public Act 34**

**Groundwater Conservation Advisory Council July 2007**

**Table TU-1.**

Type of Change	Review and Approval Process	Decision Maker
<p><b>1. Correct technical errors or make minor technical revisions.</b></p> <p>Examples: Watershed boundary, minor calculation error, correction to withdrawal registration, improved index flow estimate resulting from site specific review, or changes to the web user interface.</p>	<p>DEQ &amp; DNR technical staff to make changes as appropriate. Each change will be documented and an annual compilation will be made available online. DEQ program staff will check on effects to any registered users and notify these accordingly. An annual update will be provided to the Council. DEQ will develop internal procedure for accepting and verifying additional flow measurements. DEQ staff may revise specific segment estimates of Index Flow in the Accounting Database, based on site specific review.</p>	<p>[Level 1] DNR &amp; DEQ technical staff.</p>
<p><b>2. Technical modifications.</b></p> <p>Adjustments related to considerations of temperature, hydrology, and stream or river flow based on methodology adopted by order of the NRC.</p>	<p>DEQ &amp; DNR technical staff to make changes as appropriate. Each change will be documented with annual compilation available online. DEQ program staff will check on effects to any registered users and follow up as appropriate. An annual update will be provided to the Council.</p>	<p>[Level 1] DEQ &amp; DNR technical staff.</p>
<p><b>3. River segments.</b></p> <p>Revise the ecological type or boundaries for a river segment.</p>	<p>Recommended revisions developed by DEQ &amp; DNR technical staff will be presented to the Council for review with Council submission to NRC for review and decision by the DNR Director. Each approved change will be documented and made available annually online. DEQ program staff will determine effects to any registered users and follow up as appropriate. An annual update will be provided to the Council.</p>	<p>[Level 2] NRC.</p>
<p><b>4. Methodologies.</b></p> <p>Revise methodologies related to considerations of temperature, hydrology, and stream or river flow.</p>	<p>Recommended revisions developed by DEQ &amp; DNR staff for review by Council. This should occur not less than every 5 years. Recommendations from the Council are presented to the NRC for review and decision by the DNR Director.</p>	<p>[Level 2] NRC.</p>
<p><b>5. Modify or add statutory definitions or process.</b></p> <p>Example: Revise the characteristic and thriving fish curves based on updated analyses.</p>	<p>Recommendations developed by agencies technical staff for Review by Council. Recommendations presented by Council to the DEQ/DNR directors and legislative leadership to pursue legislative changes.</p>	<p>[Level 3] State legislature.</p>

From: Recommendation TU 4.3

WUAC final report 12-12-2014