

Appendix 5 — The SOLEC Indicator Database

This appendix provides details of the fields and features of the SOLEC Indicator Database (described briefly in Section 3.7 of this report).

Database Features - Things it can do

The database was designed primarily to assist the SOLEC Indicator Group organize and sort the hundreds of indicators that were identified for the Great Lakes. Fields were incorporated to provide descriptive information about each indicator, e.g., its title, the specific measurement to be taken, the ecosystem objectives that it supports, the purpose for the indicator, its desired endpoint or some other reference value, its features and limitations, how it will be displayed graphically, information to help interpret the indicator, and any additional comments. Taken together, this information provides a basis for a review of the proposed indicator against the SOLEC criteria, and a rationale for indicator selection for the SOLEC list.

Additional fields in the database were designed to hold information useful for sorting the indicators and tracking their progress through the process of SOLEC indicator selection. Included is information about the original source for each indicator (by Great Lakes program and/or reference document), indicator type, applicability to SOLEC categories, applicability to a number of alternative groupings (e.g., IJC Desired Outcomes), data availability, and whether the indicator had been modified or selected for the SOLEC list. Further details of the database fields and the information they contain are presented in the Database Fields section below.

All of the information about a selected indicator can be viewed on screen. A user can therefore select any given indicator, identify to which groupings it is applicable, obtain full descriptive information, and determine if a current data source has been identified.

To make the database useful to others besides the Indicator Group, additional capabilities have been added. A user has the ability to filter the indicators by a number of criteria. By entering a key word or phrase, a user can search through the Title, Measure and Purpose fields for indicators that contain the key word. For example, a search on “contamin” in these three fields will return a list of all the proposed indicators that mention contaminant, contaminants, contaminate, contaminates, contamination, contaminating, etc. All the indicators in the database can be included, or the search can be restricted to only those proposed as SOLEC indicators.

Sorting is also possible for the proposed SOLEC indicators according to a number of alternative groupings, in addition to the SOLEC categories. Groupings have been provided for indicator type (state, pressure or human activity (response)), environmental compartments, Great Lakes issues, GLWQA Annexes, GLWQA Beneficial Use Impairments, IJC Desired Outcomes, and Great Lakes Fishery Commission Objectives.

Reporting capabilities are also being incorporated into the database and will be available with the online version. Users will be able to select pre-formatted reports based on results of the sorting criteria, from simple lists of indicator titles to full page indicator descriptions. User-specified reports for selected fields in the database will also be possible.

Database Fields - Information stored about each indicator

The following are descriptions of the fields and the information they contain in the SOLEC indicator database. Not all information is available for all the indicators in the database. The most complete entries are provided for the proposed SOLEC indicators.

The Indicator “Description” Information

Name of Indicator. What is a brief, descriptive title for the indicator? Example: *Contaminants in Top Predator Fish*

Measure. What is really being measured? Example: *PCB congeners in 6 year old lake trout*

Ecosystem Objective. What environmental goals or objectives does the indicator address or support? Example: *Lake Superior LaMP Human Health Objective, “Fish and wildlife . . . should be safe to eat”*

Purpose of the Indicator. What is the larger category of interest? An indicator is a surrogate for something more consequential than the indicator, *per se*. Does the indicator provide information about the environment or human health, about a stressor (contaminants, habitat, exotic species, etc.), about sources of the stressors (industrial discharge, wetland diking, etc.), or about human activities (or responses such as laws, volunteer programs, etc.). Example: *A direct measure of the level of organic contaminants in the food chain and an indirect measure of potential harm to human health through consumption of contaminated fish.*

Endpoint. (Or range, outcome or other reference value) What is the frame of reference to interpret the indicator? Example: *FDA Action Limit = 2.0 ug/g PCB in fish tissue.*

Features of the Indicator. As applicable, describe space and/or time scales represented by the indicator, anticipated variability, linkages with other indicators, and/or other information to help determine or document the viability of this indicator to be included on the SOLEC list. Example: *Measurement of the concentration of PCBs in whole lake trout has been part of an annual program for over 20 years. To reduce variability in the analytical results and to increase the ability to track trends in the levels of contaminants over time, fish from the same age/size are collected each year from designated locations in each lake, and they are composited for analysis*

Illustration. What will be displayed graphically? How will the display incorporate the desired endpoint or reference value? Example: *For each lake, a graph will be displayed showing the annual mean concentration and 95% confidence intervals of total PCBs in lake trout composites. The data series from 1972 to the present will be included. Reference concentrations will be marked on the figure for comparison to the measured values.*

Limitations of the Indicator. How costly are the data to collect at the recommended frequency? What issues may compromise the utility of the indicator? How closely linked is the indicator to the broader issue being assessed? Example: *This is a relatively costly indicator that requires much coordination and collaboration between federal, state and provincial agencies. The indicator, however, is very closely linked to the overall abundance of mobile PCBs in the Great Lakes ecosystem. The indicator is an integrator of the level of PCBs in the*

food web over large areas of each lake over several years, therefore it cannot be effectively associated with specific sources.

Indicator Interpretation. Is other information needed to place this indicator in context? On what basis can the subjective tags of “good” and “poor” be applied to the state of the environment or to progress toward the ecosystem objective being supported by the indicator? Example: *Variations in feeding habits or food web structures could affect annual results and complicate interpretations of long-term trends. Measurements of PCBs (particulate and dissolved) in the water column would help distinguish food web influences from changes in the environmental concentrations of PCBs. A scale from, say 50 ppm (worse than found in 1972) to 0.05 ppm (the proposed health protection value, even though it is for fillets and not whole fish) could be used to apply subjective assessments to the degree to which the ecosystem is free from PCBs: 50 ppm = totally unacceptable, 5 ppm = poor, 0.5 ppm = fair and 0.05 ppm = good.*

Comments. Provide any other information that would assist the process of indicator selection or the application of the indicator. Is a particular methodology required? Are special calculations needed to derive or interpret the indicator? Is additional work needed to define the indicator? Is the indicator feasible? Example: *To maintain compatibility with the historic, long-term data, established protocols for fish collection, sample preparation and analysis must be followed. This indicator has been in use in the Great Lakes basin for over 20 years. It is directly related to Great Lakes objectives, widely accepted, easily understood, and the supporting data are of high quality.*

The Indicator “Sorting” Information

Indicator Name. This field is copied from the “description” section above.

Measure. This field is copied from the “description” section above.

Reference Document. What document did the indicator come from? Major sources of proposed Great Lakes indicators included the Lakewide Management Plans, IJC, Great Lakes Fishery Commission, and previous SOLEC background documents.

Indicator Type. For which element of the State-Pressure-Human Activities (Response) framework does the indicator provide information?

Applicable SOLEC Indicator Category. Previous SOLEC presentations and reports were organized around a few major ecosystem components and human interactions. To be consistent with, and extend these foundations, the indicators can be grouped accordingly. The categories include: Open Waters, Nearshore Waters, Coastal Wetlands, Nearshore Terrestrial, Land Use, Human Health, Societal and Unbounded.

Applicable to other programs or groups. The SOLEC Indicator Group has made an initial judgement concerning the applicability of each indicator to other programs or useful groupings. Current groupings have been provided for environmental compartments (e.g., air, water, land, sediments, biota, fish, humans), Great Lakes issues (e.g., contaminants and pathogens, nutrients, exotics, habitat, climate change, stewardship), GLWQA Annexes, GLWQA Beneficial Use Impairments, IJC Desired Outcomes, and Great Lakes Fishery Commission Fish Community Objectives.

Status as SOLEC indicator? The database has been useful to help organize and sort indicators, but not every indicator will be nominated to the SOLEC List. Therefore, a field containing the status of each indicator was included in the database. “ *Under Consideration* ” applies to those indicators under consideration for the SOLEC List. “ *Selected* ” applies to those which are included in the SOLEC list. “ *Not Selected* ” applies to those not proposed for the SOLEC list, even though they may be useful in another context. “ *Concept Retained* ” applies to those which contain one or more features that were combined, merged, or altered and that exist in another, related indicator (with the new indicator number in brackets—i.e. *Concept Retained (7008)* means that a feature of this particular indicator exists in indicator number 7008).

Data Availability. Recent data that directly support the indicator would greatly improve an illustration of the indicator and would provide a means to immediately report on the ecosystem component being measured. Three aspects to indicator data are retained in the database: *Data Availability* (Yes, No, Unknown), *Data Quality* (Excellent, Good, Fair, Poor, Unknown), and *Data Source and Comments* (Where are the data? Is a time series available? What other information is available about the data?).