

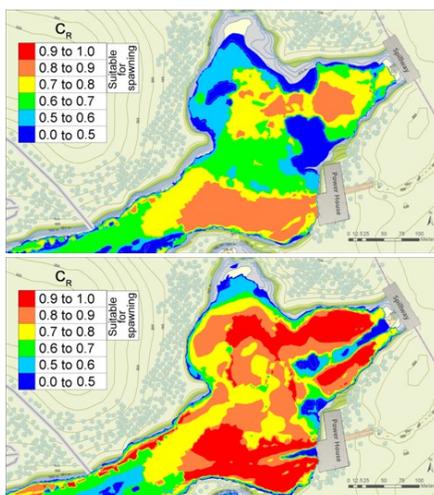
Detailed substrate (top) and hydrodynamic (bottom) data is required

**STURGEONMAPPER - FISH HABITAT SUITABILITY MODEL**

Coldwater, working with Kilgour and Associates, has developed computational models for a number of fish species based on work by the US Geological Survey and Ontario Hydro. These models are constructed on the basis of expert opinion of the major factors that influence the presence/absence of individuals of specific life-stages.

The SturgeonMapper model is based on research undertaken by Ontario Hydro and incorporates data on water depth, substrate texture, stream temperature and flow velocity as predictors of the suitability of a habitat parcel to a specific life-stage of sturgeon. SturgeonMapper has three general components:

- a reproductive component that quantifies the spawning suitability for the species;
- a juvenile foraging component that quantifies the habitat preferences of juvenile sturgeon; and
- an adult foraging component that quantifies the habitat preferences of adult sturgeon.



Comparison of sturgeon reproductive score for a dry year (top) and a wet year (bottom).

SturgeonMapper is unique in that it provides a time-varying, usually daily, prediction of habitat suitability, so that temporal variation in habitat suitability indices (HSI) can be studied. With this approach, the impacts of even subtle changes to the system (e.g., peaking /ponding operations in a regulation plan) can be identified. The model also contains routines to assess the effects of high-frequency oscillations (e.g., hydroelectric powerhouse shutdowns) on post-spawning stranding.

SturgeonMapper requires detailed bathymetry, hydrodynamic, substrate and stream temperature data. A significant amount of pre-processing is required to generate the input data. The time-varying, two-dimensional hydrodynamic data is obtained from finite element model simulations conducted separately. Coldwater has developed proprietary software that uses these hydrodynamic simulations together with the hydrograph to develop the required long-term input files.

SturgeonMapper has a variety of output options, ranging from temporal and average maps of foraging and reproductive component to estimates of suitable/productive habitat areas.