Identifying HPV Chemicals of That May Pose a Risk to the Great Lakes Fishery

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Project purpose:

To demonstrate use of HPVIS as tool to screen high volume chemicals for qualities that may pose a threat to the Great Lakes

Why the Great Lakes ?

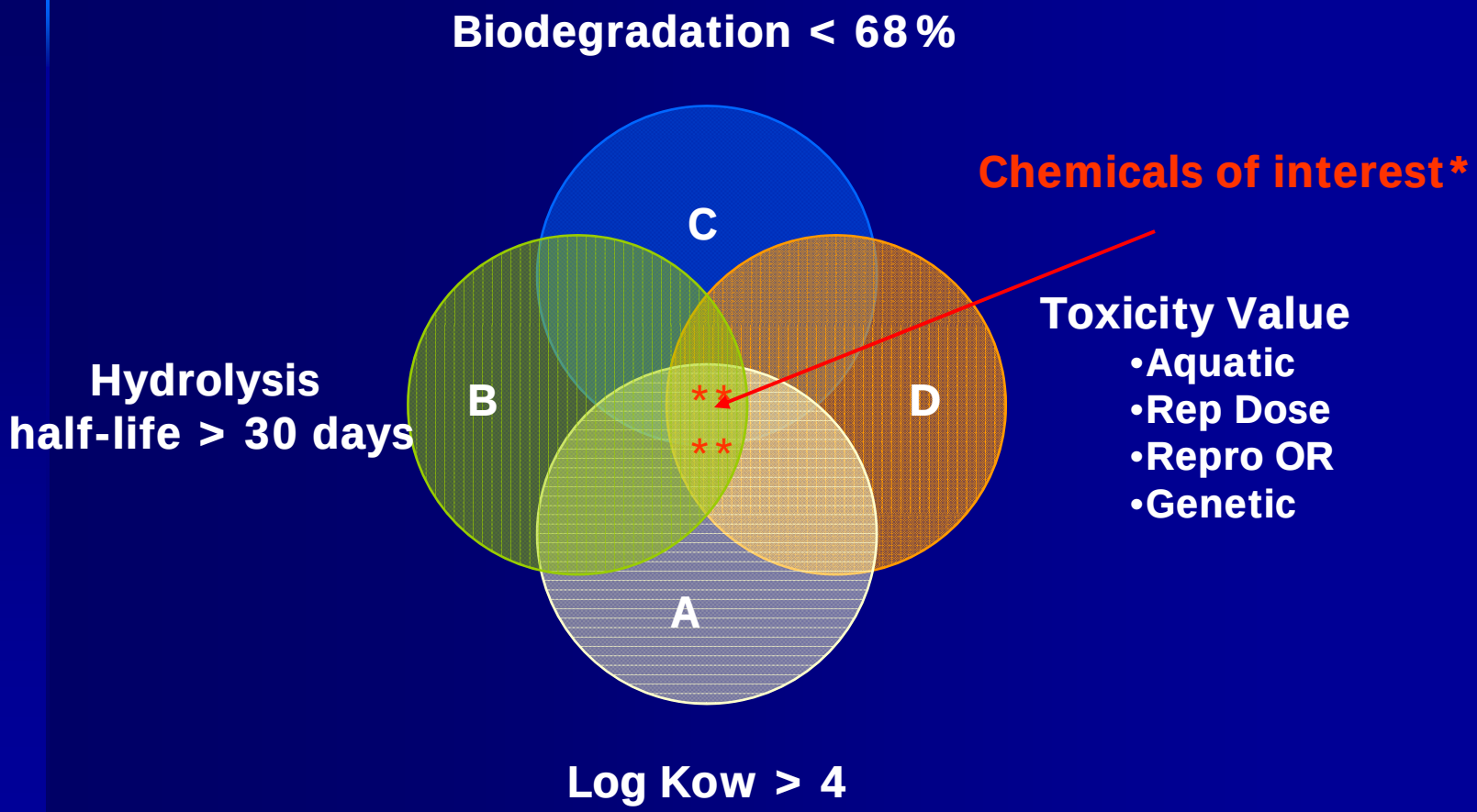
- International source of fresh water and a major fishery
- Commercial and sport-fishing revenues exceed $4 billion annually
- Large surface area and shoreline make the lakes susceptible to contamination
- Depth and size of lakes makes cleanup impossible and turnover of water very slow
- Prevention is the key to protection

Chemical Impacts on Fishery

Toxic chemicals can -

- **Reduce the food supply by killing aquatic plants, algae, plankton, etc.**
- **Affect reproduction or survival of fish**
- **Bioaccumulate in fish tissue making ingestion unsafe for humans and wild life**

Finding chemicals of interest



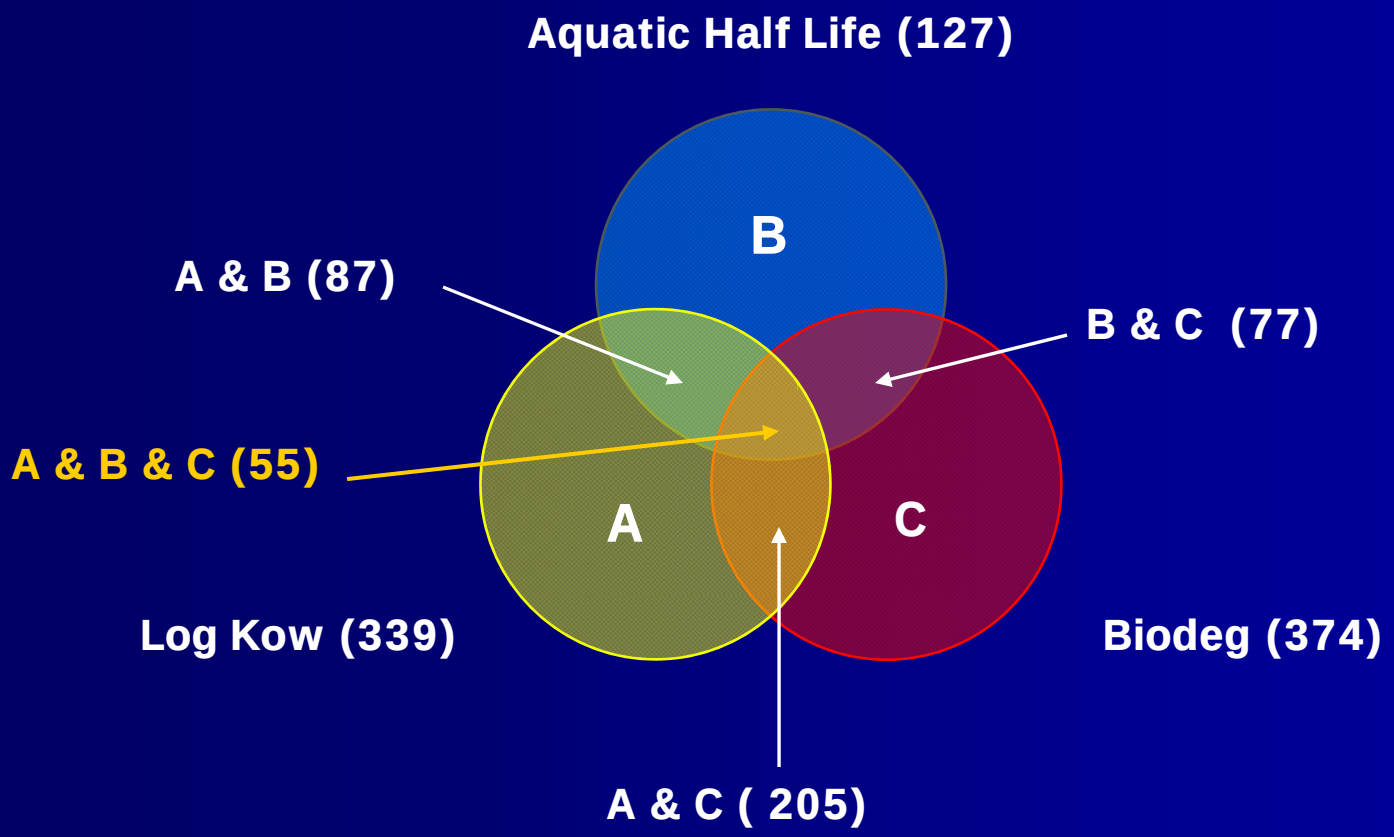
Methods Used

1. HPVIS was queried for each endpoint
2. Data was exported to Excel files
3. Files were edited using Excel and imported into MS Access
4. MS Access queries were used to match chemicals that met study criteria for each endpoint

Data in HPVIS

Endpoint	No of CAS numbers
At least one endpoint	879
Log Kow	339
Ready Biodegradation	375
Aquatic Half-Life	127
Aquatic Toxicity NOAEL	254
Repeat Dose NOAEL	233
Genotoxicity	335
Reproductive Toxicity	80
All 7 endpoints	14

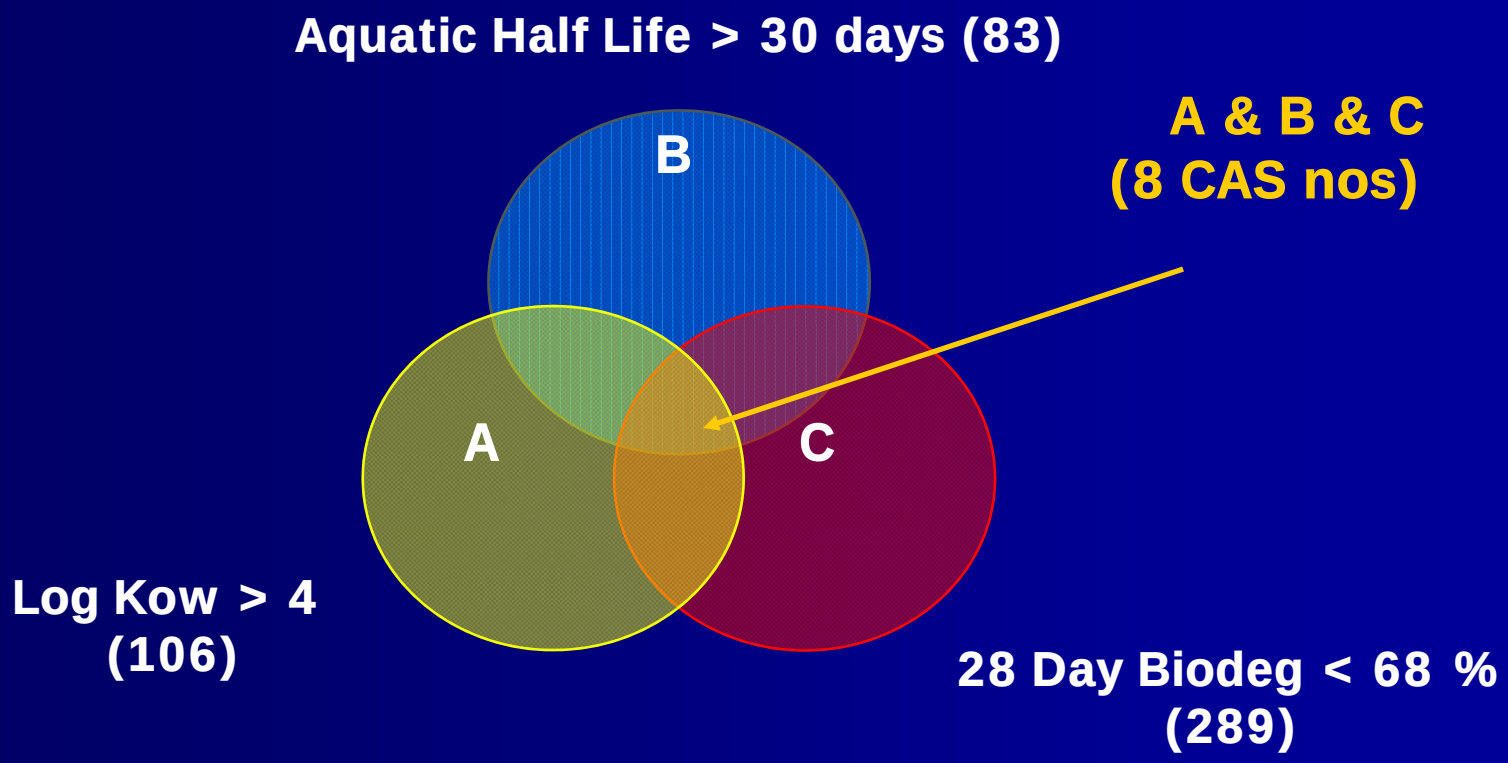
Availability of Data for Fate Endpoints



Chemicals that met criteria for study

A.	Max Log Kow > 4	106
B.	Min Ready Biodegradation < 68%	265
C.	Max Hydrolysis Half-Life > 30 days	83
D.	Min Aquatic Toxicity NOAEL < 10 mg/L	146
E.	Min Repeat Dose NOAEL < 10 mg/kg/day	21
F.	Min Genotoxicity NOAEL < 10 mg/kg/day	96
G.	Min Repro Tox NOAEL < 10 mg/kg/day	6
	Fate and one or more toxicity value	5

Chemicals that meet environmental fate criteria



Of 8 Chemicals That Met Fate Criteria -

1 is genotoxic

1 is toxic in repeated dose assay

5 are aquatic toxins

5 are toxic in one or more test system

HPVIS Structure

Each data value and its descriptors has been entered as a separate record

- **A query for multiple endpoints can provide large files with hundreds of records**
- **The resulting file may contain several data values for each endpoint.**
- **Using MS Access queries can alleviate this somewhat.**

HPVIS Structure

- **Multiple data values**

  For example, several Log Kow values for a given substance. Users need to decide which value to use (Minimum, maximum, mean, median, most recent, etc)

- **Units vary for some endpoints**

  Half-lives are provided in seconds, minutes, days, weeks, months, and years

  Doses given as ppm, mg/kg, % diet, mg/L, and mg/kg/day

HPVIS Structure

Some field names were vague and not linked to an endpoint.

Several CAS numbers may be listed for a single data value. It can be hard to know which chemical the data represent.

Numeric fields were often created as text fields and could not be sorted

Data Quality

- Test methods for HPVIS data are not standardized
- Some numbers are “better” than others
- Test conditions, exposure times and species can vary

Data Quality

HPVIS vs PBT Profiler

BCF's from PBT Profiler were lower than predicted by Log Kow's found in HPVIS

PBT Profiler provided aquatic toxicity values that weren't found in HPVIS

Recommendations

- Ensure website is fully functional
- Link each data field to an endpoint
- Standardize reporting units
- Ensure that numeric data can be sorted
- Validate data
- Limit data entries to ‘best available’ result
- Encourage/reward completeness of entries
- Explain each SIDS endpoint and test method

Conclusions

- HPVIS provides a large amount of data that can be accessed at no cost from any location in the world
- High-use chemicals are of concern to many groups, so use will be high
- Both environmental fate & toxicity information are available

Conclusions

- Although the HPVIS is incomplete, we were able to evaluate data for 55 HPV chemicals
- Additional data will become available soon
- HPVIS provides a valuable tool that can be used to prioritize chemicals for further evaluation