ZEBRA MUSSEL WORKSHOP

Zebra Mussel Risk Assessment - Saskatchewan Waterbodies

DATE: **April 28, 2010**

LOCATION: **Saskatoon inn**

Presented by:

SaskPower

Rick West –Supervisor, ESPER

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Identifying Pathways for Zebra Mussels to Enter Saskatchewan

- **Zebra mussels (*Dreissena polymorpha*) have spread rapidly in eastern North America by dispersal within connected bodies of water.**

- **Fortunately, they have made slow progress to inland lakes which has given provinces in western Canada time to prepare and implement preventative methods and raise public awareness on the threats posed by zebra mussels.**

- **Our inability to confidently predict where zebra mussels will first colonize in the province prompt us to identify the most likely pathways thru which zebra mussels may enter and the bodies of water most suitable to host them.**

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- The most serious threat to Saskatchewan waters are the activities of anglers, hunters, general boaters, and boat buyers that visit our waters from infested waterbodies.
- Earlier review of waters indicates suitability for, the difficult part is knowing when exactly they will arrive.
- The majority of American anglers and hunters entering Saskatchewan are likely to use the southern border crossings at North Portal (Highway 39), Port of Raymond (Highway 6) or come through southern Manitoba, making these borders a focal point to begin initial action against the zebra mussel.

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- With Rafferty Reservoir established as a good fishing destination, many American anglers from Montana, North Dakota and South Dakota make day trips to fish there in the summer.
- Rafferty would appear to have a high risk of infestation based on its popularity, close proximity to waters presently infested, and high physical colonization rating.
- Boundary and Alameda Reservoirs are also located in the south eastern part of the province and therefore are also potential locations at risk for zebra mussels infestation.

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- **Based on their geographic location and popularity among both resident and non-resident anglers, Lake Diefenbaker and the Qu'Appelle Valley river and lakes would be the next likely potential colonization hot spot.**

- **In 1995, approximately 11,000 anglers visited Lake Diefenbaker and another 17,700 angled in the five lakes making up the Qu'Appelle Valley system (Brickley, Joerissen 1998).**

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- Even though we can not differentiate between American and Canadian anglers, the high quality fishing and the numerous fishing tournaments at both these areas do attract anglers from the United States.
- The last of the high potential waterbodies is Tobin Lake in the north central part of the province. Approximately 9,660 anglers visited Tobin lake in 1995 (Brickley, Joerissen 1998).
- This area is also a risk because of its angling popularity and tournaments which may draw American anglers.

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- Despite our assumption that zebra mussels will most likely enter Saskatchewan via non-resident recreationalists, if ever established, spread of zebra mussels throughout the province will likely be the result of Saskatchewan and Canadian resident anglers moving from one body of water to another within the province.
- Presently, Manitoba does not have zebra mussels but has many waterbodies with high and moderate potential for colonization in their prairie eco-zone (Sorba, Williamson 1997).
- In Alberta, Cold Lake has one of the largest in-land marinas in North America. This marina may have boats shipped in or visiting from infested waters. It is also unknown what events in Alberta take place that may attract boat users to their waters from areas in North America that are infested.

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- **Events such as Regina's annual Dragon Boat races on Wascana Lake and the Saskatoon River Roar on the South Saskatchewan River, increase the likelihood of introducing zebra mussels or other nuisance species from other waterbodies.**
- **Boats and boat motors that have been in infested waters are potential ways that zebra mussels can be introduced and future monitoring and inspections should be done before these boats enter the water.**

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- To prevent the introduction and establishment of zebra mussels in the province, two key objectives need to be achieved.
  - One is to establish a working relationship with agencies within the province of Saskatchewan as well as with bordering provinces.
  - Secondly, the public needs to be educated about the how to prevent accidental introductions and the impact zebra mussel have on an ecosystem.
- Our most important ally in the fight against ANS is public knowledge and cooperation.

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Zebra Mussel Risk Assessment – Based on Water Quality

- **As a follow up to the research and report "Strangers In a New World: The Problem with Exotic Organisms in Saskatchewan" completed by Dr. Richard Espie, Saskatchewan Ministry of Environment decided to research the susceptibility of Saskatchewan waters to zebra mussel (*Dreissena polymorpha*) colonization (2001).**
- **Presently there is no model for predicting a waterbody's potential for zebra mussel colonization, but much is known about the environmental tolerance of zebra mussels to various water quality factors.**

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Zebra Mussel Risk Assessment – Based on Water Quality

- **Using seven water chemistry variables in a matrix published by O'Neill (1996), the suitability of the waterbodies were evaluated and assessed a colonization potential of High, Moderate, Low, and Very Low.**

- **These chemistry variables for 38 individual locations, representing 29 different waterbodies in Saskatchewan, were compared to the matrix to determine the zebra mussel colonization potential for each waterbody.**

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Zebra Mussel Risk Assessment – Based on Water Quality

Values used for pH, temperature, dissolved oxygen and calcium to assess risk of zebra mussel invasion

	High Risk	Moderate Risk	Low Risk	Very Low Risk	None
pH	8.0 – 8.5	7.4 – 8.0 8.5 – 9.4	6.8 – 7.4 9.4 – 9.6	4.6 – 6.8 9.6 – 10.0	<4.6 >10.0
Temperature (ºC)	16 – 24	12 – 16 24 – 28	9 – 12 28 – 30	0 – 9 30 – 40	<0 >40
Dissolved Oxygen (mg/l)	>8.0	6 – 8	4 – 6	2 – 4	<2.0
Calcium (mg/l)	>50	25 – 50	12 – 25	8.5 – 12	<8.5

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Zebra Mussel Risk Assessment – Based on Water Quality

- **Approximately 74% or 28 individual sites rated High for colonization and 21% rated Moderate colonization potential. Only 5% rated Low with no sites rating Very Low.**

- **The three major waterbodies studied that are nearest infested waters, Boundary Reservoir and Rafferty Reservoir, rated High and Alameda rated Moderate.**

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Conclusion

- **Once zebra mussels establish themselves in a provincial waterbody, their spread throughout Saskatchewan will occur with no way of stopping its progress.**

AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE

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