

Wetland Restoration and Creation

Habitat Wetlands



EARTH 444/BIOL462

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Restoration

- Returned from a disturbed or totally altered condition to a previously existing condition by some kind of human action
- Not really necessary to know what pre-existing conditions were, just need to know that wetland existed
- Not necessary to return to pristine condition for restoration

Restoration

- **Passive Restoration:** natural processes are able to return to pre-disturbance state without direct human interferences
- **Active Restoration:** human influences are required to return the wetland to some pre-existing condition

Creation

- Conversion of a non-wetland area into a wetland through human action
- Assumes site has never been wetland (i.e. in last 200 years); thus not restoration

Creation

- **Artificial:** exists only as long as there is continuous and persistent action by humans; without humans site would revert back to non-wetland original condition
- **Human-induced:** results from one time action by humans and persists on own; may be intentional or unintentional action by humans

Enhancement

- The increase in one or more wetland values of all or a portion of the wetland by human activities, sometimes at the expenses of other wetland value(s)
- Often confused with restoration
- Intentional alteration of an existing wetland to provide conditions which previously did not exist and by consensus increases one or more values
- EXAMPLE: diking of marshes to create more open water for waterfowl habitat

Mitigation

- Is the actual restoration, creation, or enhancement of wetlands
- **Mitigation banking:** the restoration, creation, enhancement undertaken expressly for the purpose of providing compensation for wetland loss

Biodiversity Offsetting

- Used to compensate or mitigate the negative impacts of development on biodiversity
- Ensures an equivalent magnitude and (usually) kind of biodiversity is replaces that which is lost
- Offsets may be undertaken voluntarily, or may be mandated by a regulator, or by law or policy.
- Now part of new Wetland Conservation Strategy for Ontario (proposed)

Key Principles

Proposed by Ontario Nature

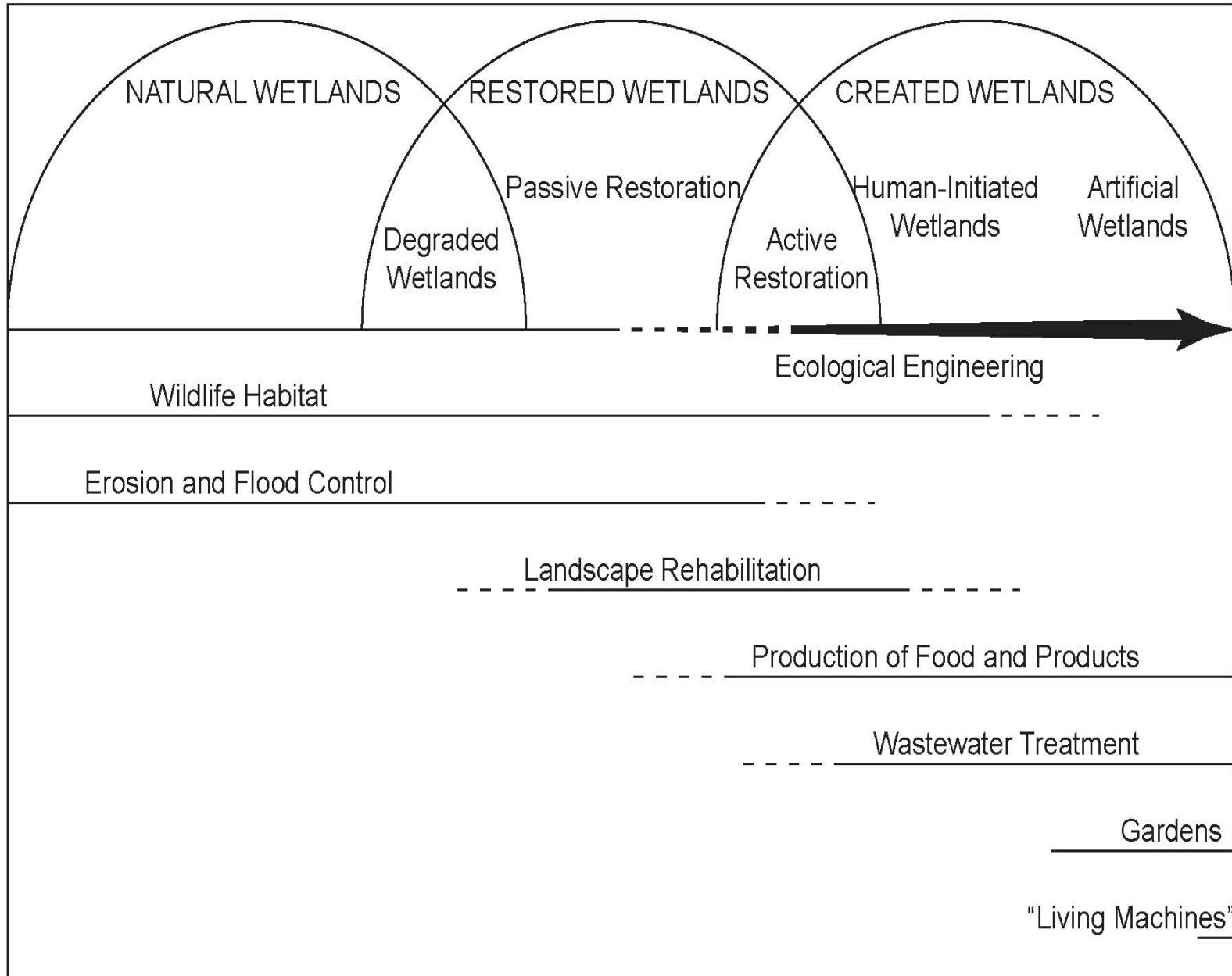
- Offsetting should be within a clear mitigation hierarchy. First, negative impacts should be avoided wherever possible. Second, any unavoidable negative impacts should be minimized to the extent possible.
- Offsetting should require an overall net gain.
- Some sites, features and habitats should be off-limits to offsetting, based for example on vulnerability and irreplaceability.
- In establishing equivalence, the offset must take into account not only quantity (size) but also quality with respect to the condition of both sites and their landscape context.
- The outcomes secured through an offset should last at least as long as the project's impacts, and ideally in perpetuity.
- Offset location should be based on defined conservation outcomes.
- The pricing of offsets should cover the complete costs of the delivery of the offsets (including costs of entering into an agreement, creation and maintenance of the offsets, monitoring and reporting).

Problems with Offsets

- Requires specialized wetland experts
- Such specialists should be licensed professionals
 - PWS – Professional Wetland Scientist administered by Society of Wetland Scientists Professional Wetland Scientist Program
- Require greater regulator involvement and oversight
- More costly than at present if done correctly!!!!

Success

- Achieving established goals
- Restoration, creation, and enhancement requires that criteria, preferably measureable as quantitative criteria; criteria established prior to commencement of project
- “success” may not be achieved, but yet might provide other new or unexpected favourable values which might be deemed beneficial





Origin of Acadians



Acadian settlements 1605

(From:
http://www.himandus.net/hofh/chauvin/richard/richard_00_acadian_history.html)



(From: <http://www.collectionscanada.gc.ca/obj/021013/f1/nlc008883-v6.jpg>)



The construction of dykes and aboiteaux was based entirely on co-operative labour. (Painting by Azor Vienneau. Courtesy: Nova Scotia Museum)



Aboiteaux, Beaumont, New Brunswick

(From: http://www.ameriquefrancaise.org/media-2384/Aboiteaux_MAUM_18pt.jpg)



1850-road building in S. Ontario

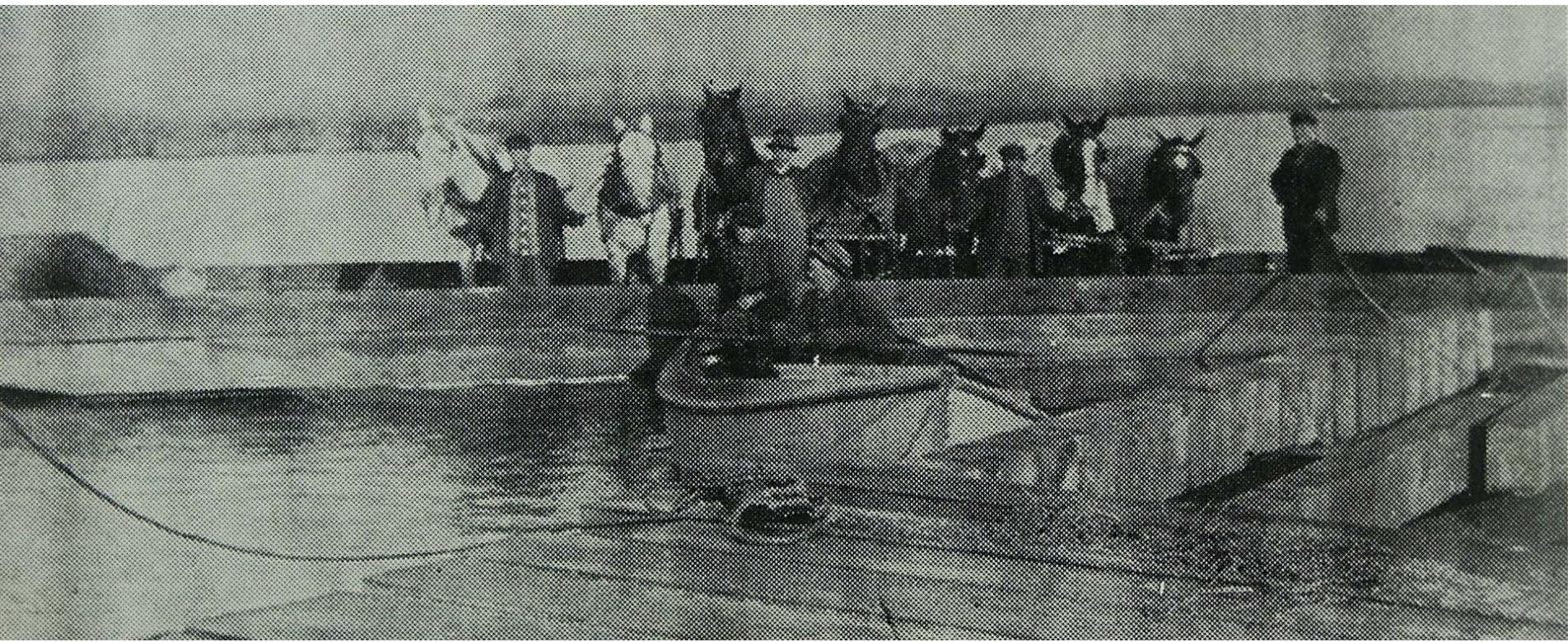


(from: canadasite.com- JD Kelly painting)

1844-corduroy road through swamp,
Orillia



(Source: Toronto Public Library)



(From: http://www.ourstoriesinnisfil.ca/fedora/repository/ourstories:9683/OBJ/FULL_SIZE.jpg)

Steam-powered dredging machine, 1925-1927, Holland Marsh



(From: <http://reflectivethoughtsbybarbara.blogspot.ca/2012/11/the-holland-marsh-ontario.html>)





Habitat Wetlands

Restoration and Creation – Habitat Wetlands

- required to reverse historical losses through conversion to other land uses
- Canada has lost as much as 70% in key regions such as the Fraser Valley, southern Prairies, southern Ontario, St. Lawrence Valley and parts of Nova Scotia and P.E.I. – more in some parts

Wetland Risk Areas

- High
- Moderate
- Low to none

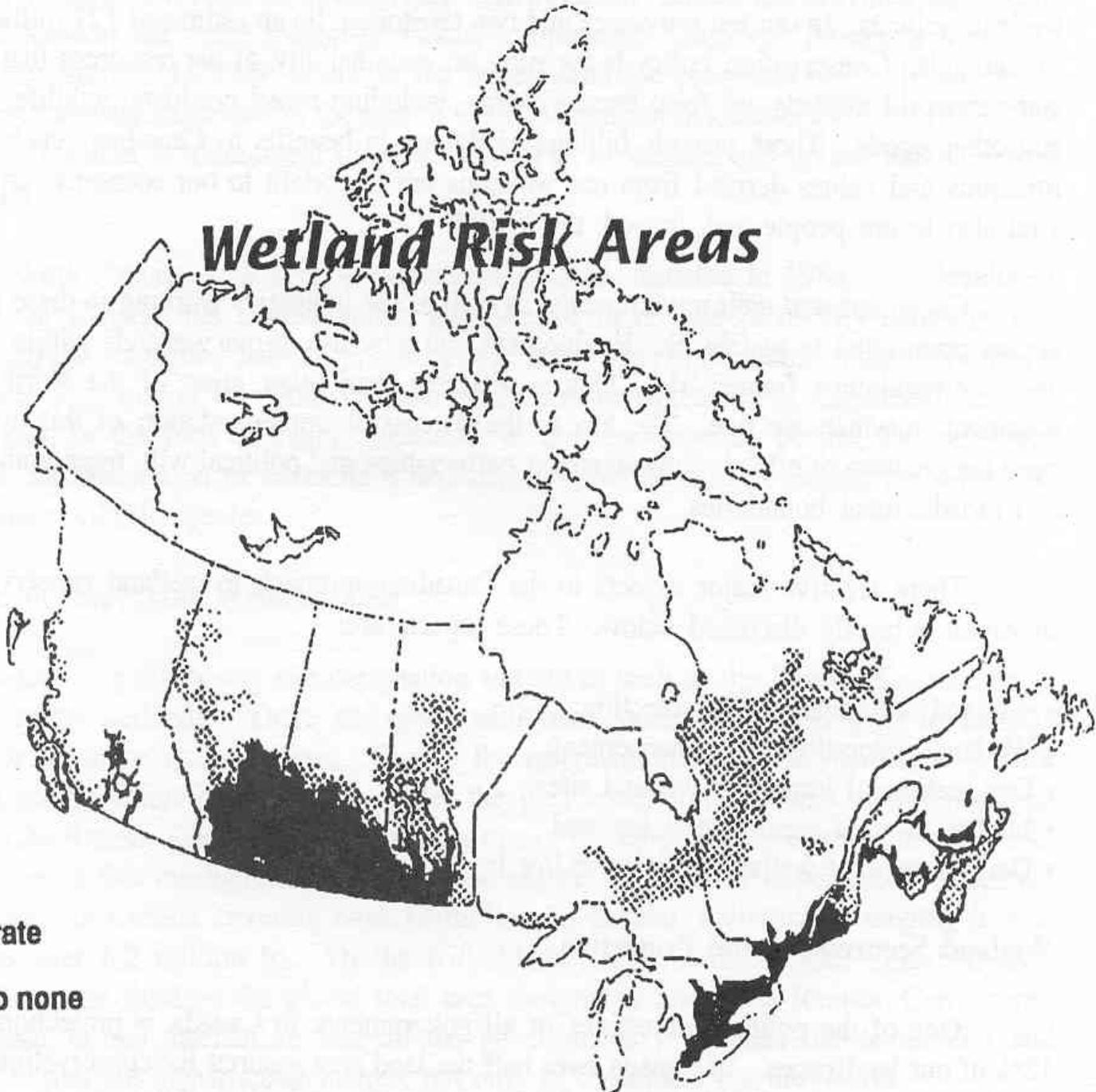
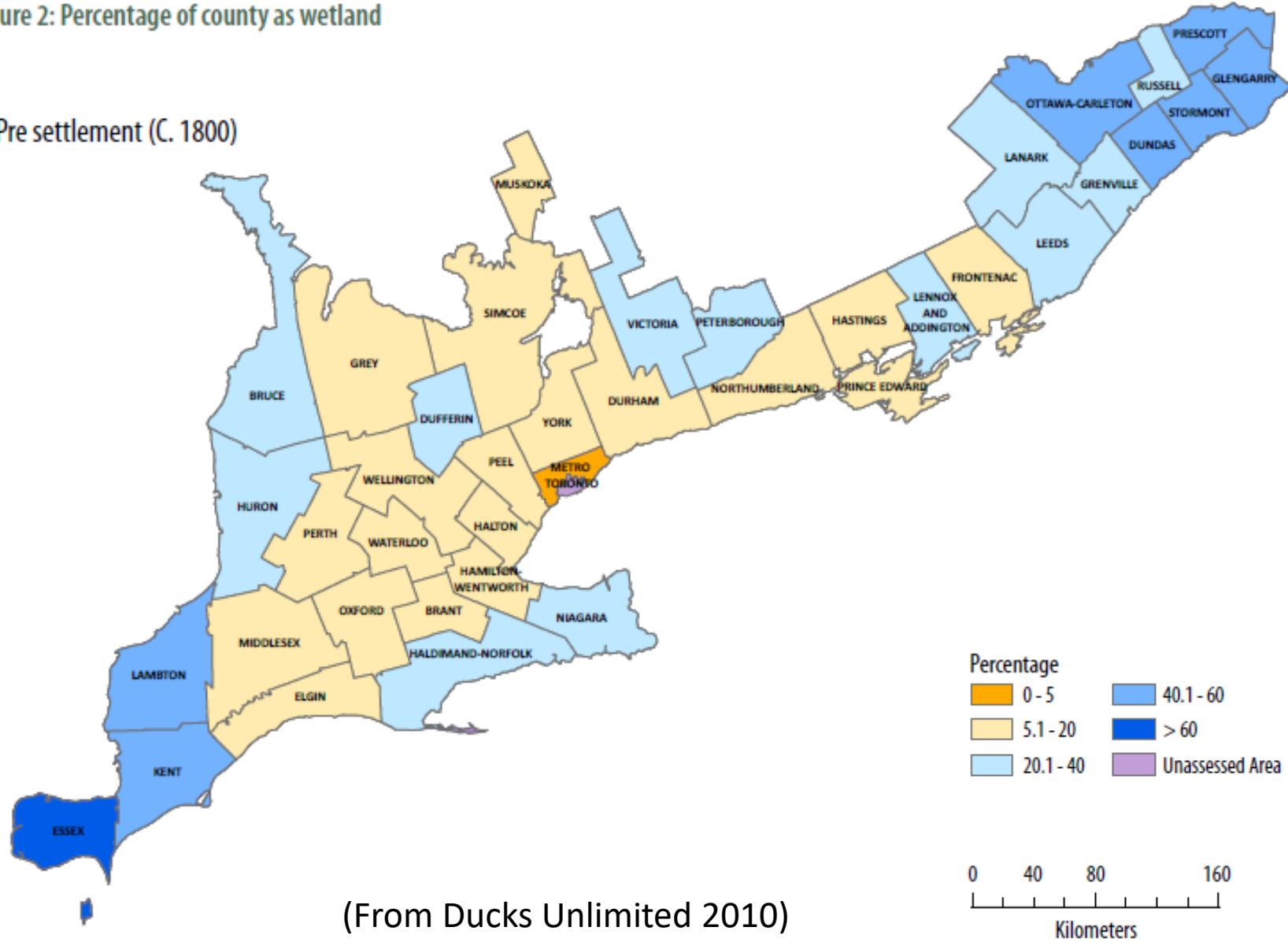


Figure 2: Percentage of county as wetland

a) Pre settlement (C. 1800)



b) In 2002

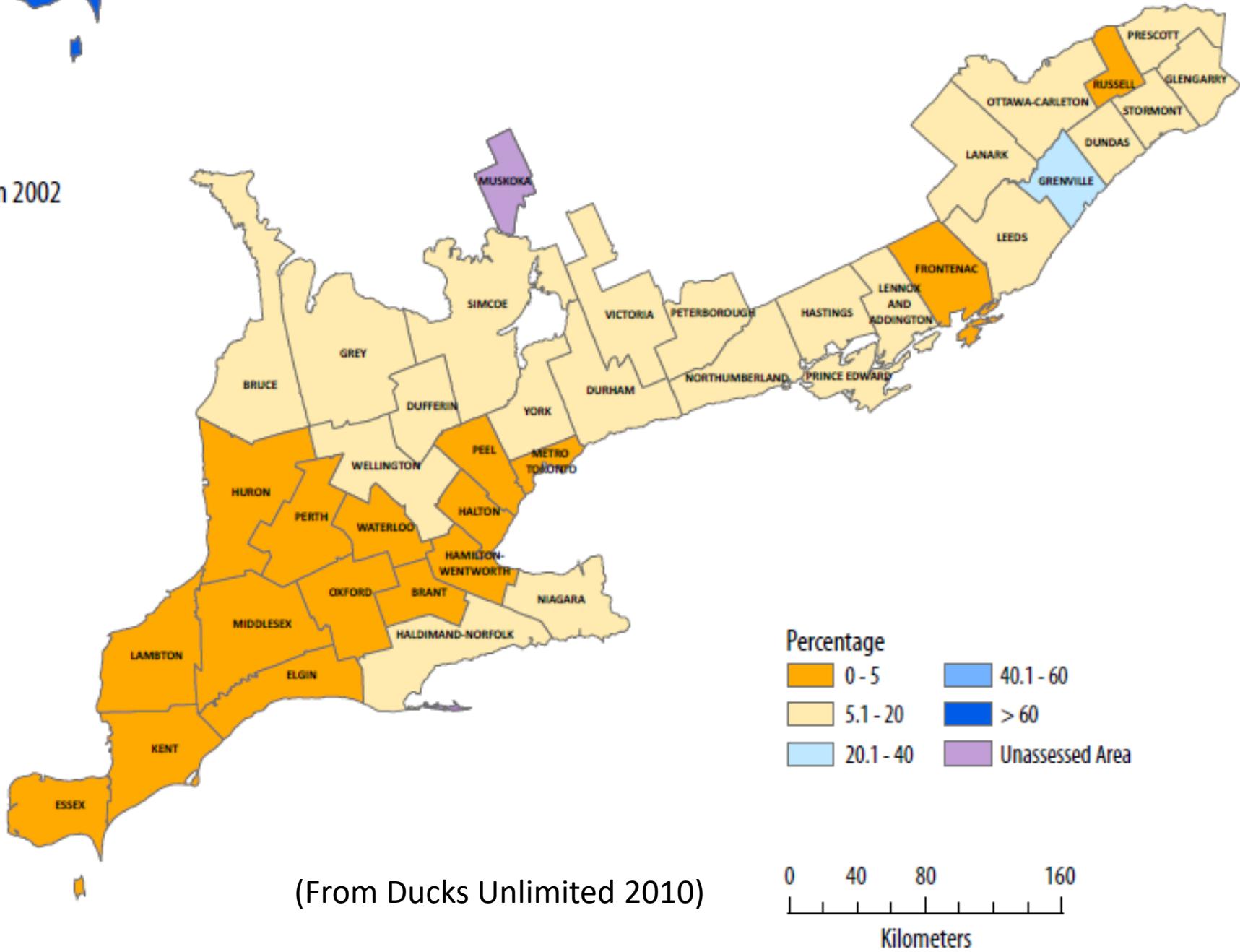
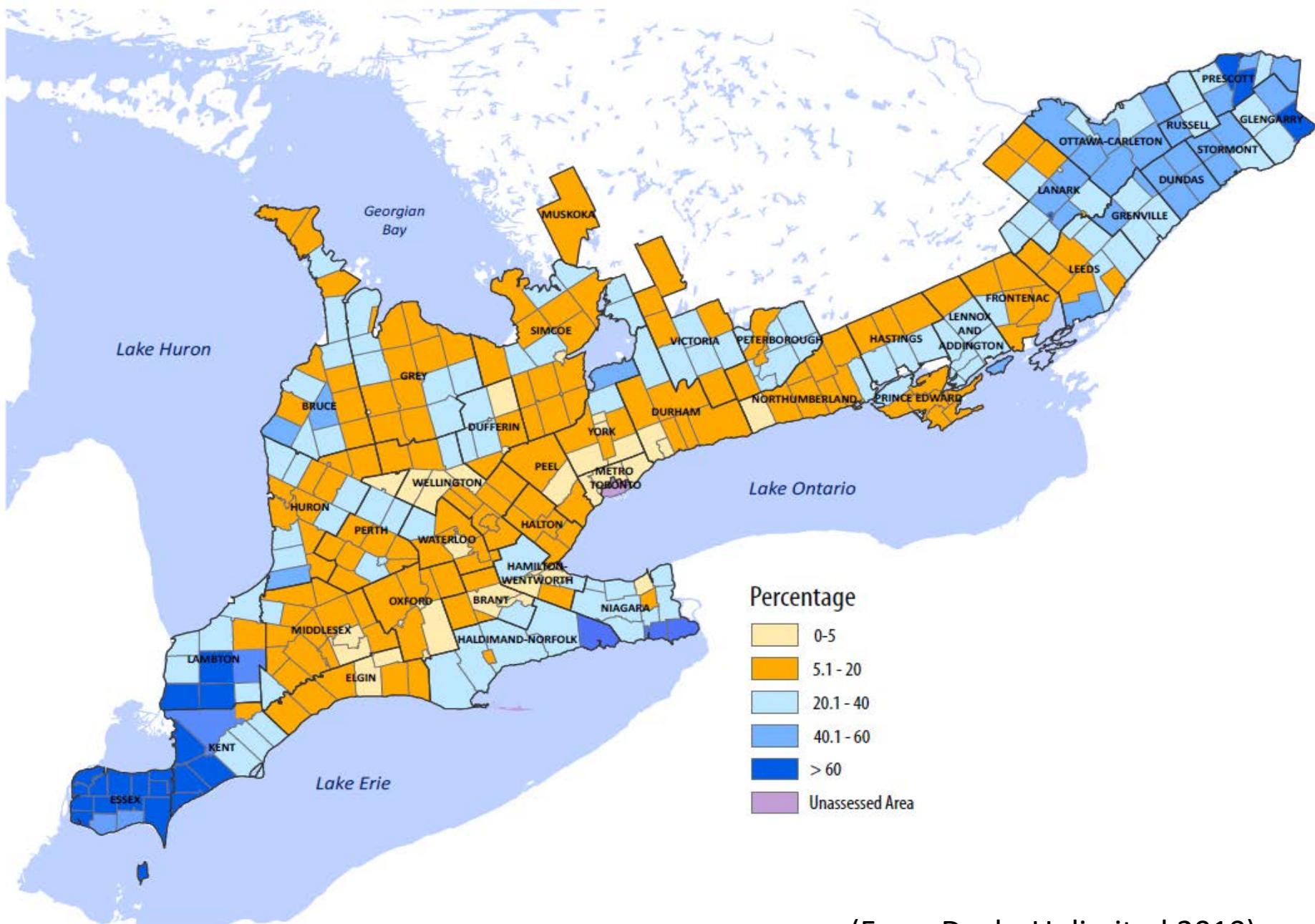
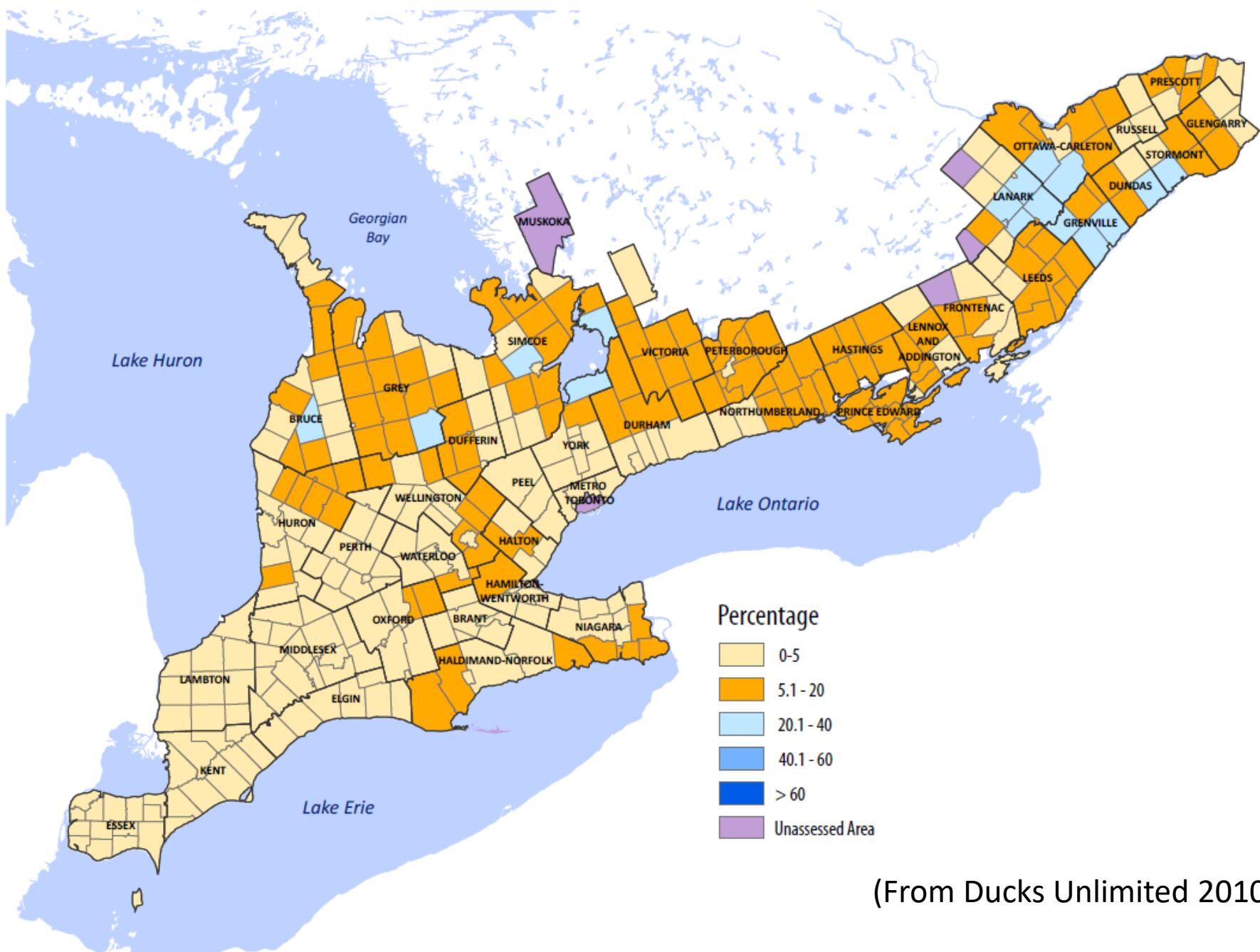


Figure 3: Percentage of township as wetland pre-settlement (c.1800)



(From Ducks Unlimited 2010)

Figure 4: Percentage of township as wetland in 2002



Wetland conversion in southern Ontario

	<i>ca. 1800</i>	1967	1982	2002
Total Area (ha)	2,026,591	637,020	631,699	560,844
Total Area %	24.8	7.8	7.7	6.8
Net Loss %		68.6	0.84	11.2

(Data from Ducks Unlimited 2010)



Ducklings huddled in the last of the water and then wandered across the prairie in search of a new home.

1930s Dustbowl on the Prairies



S
Sand storm formation



Flooded marshland



Bert Cartwright at Big Grass Marsh Headquarters. Ranger's cabin and tower.

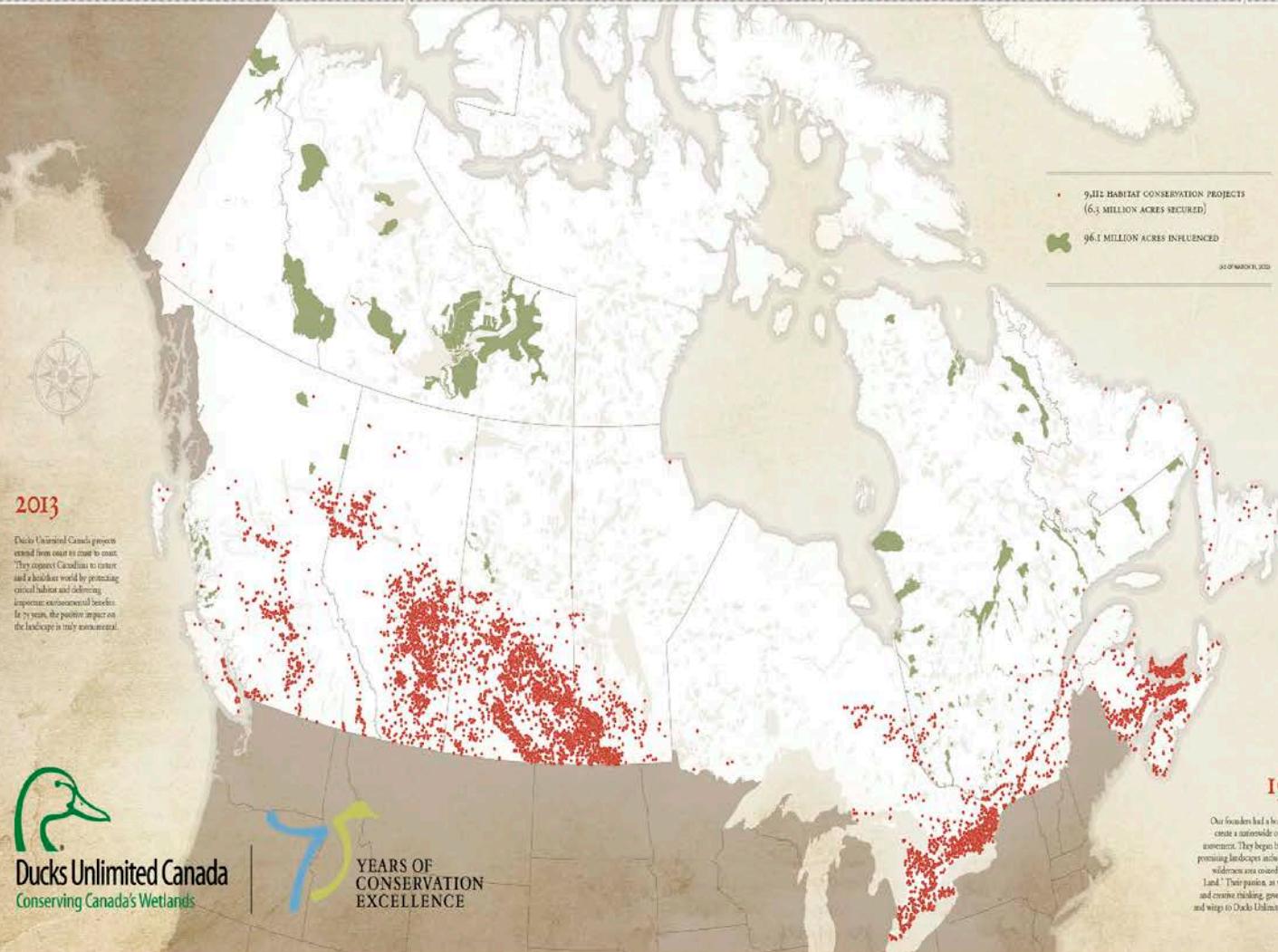




Dam was completed December 5, 1938; project reached full level 1942.



Building the dam on Jackfish Lake, Big Grass Marsh. Ducks Unlimited's first structure.



DUCKS UNLIMITED CANADA



Ducks Unlimited Canada
Conserving Canada's Wetlands



75 YEARS OF CONSERVATION EXCELLENCE

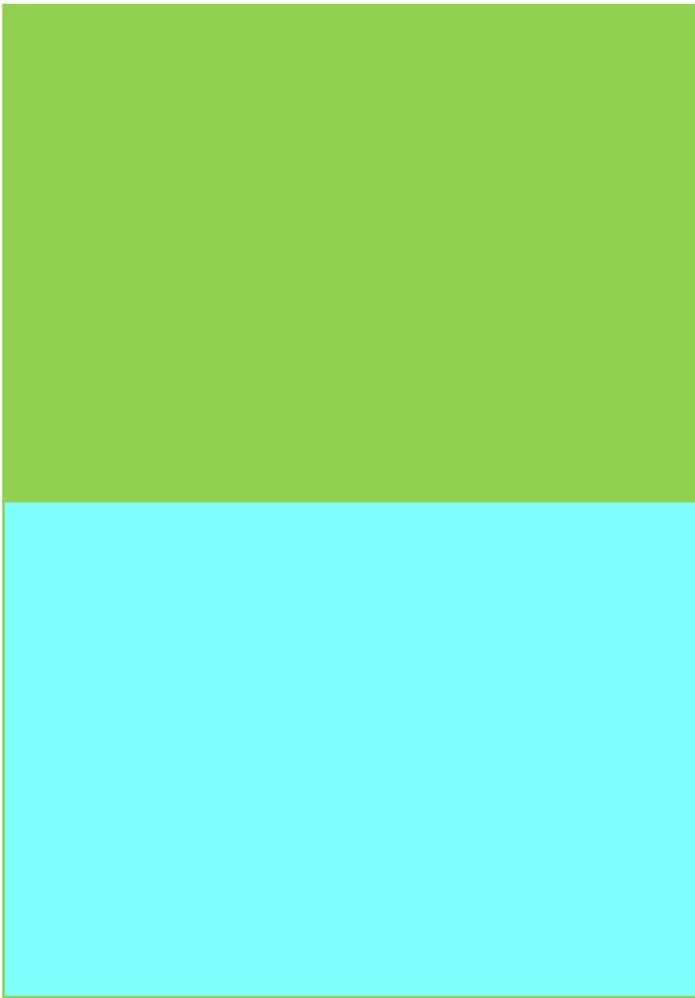
1938

Our founders had a bold vision to create a nationwide conservation movement. They began by exploring promising landscapes including a large wilderness area coined "No Man's Land." Their passion, as well as bold and creative thinking, gave both nests and wings to Ducks Unlimited Canada.

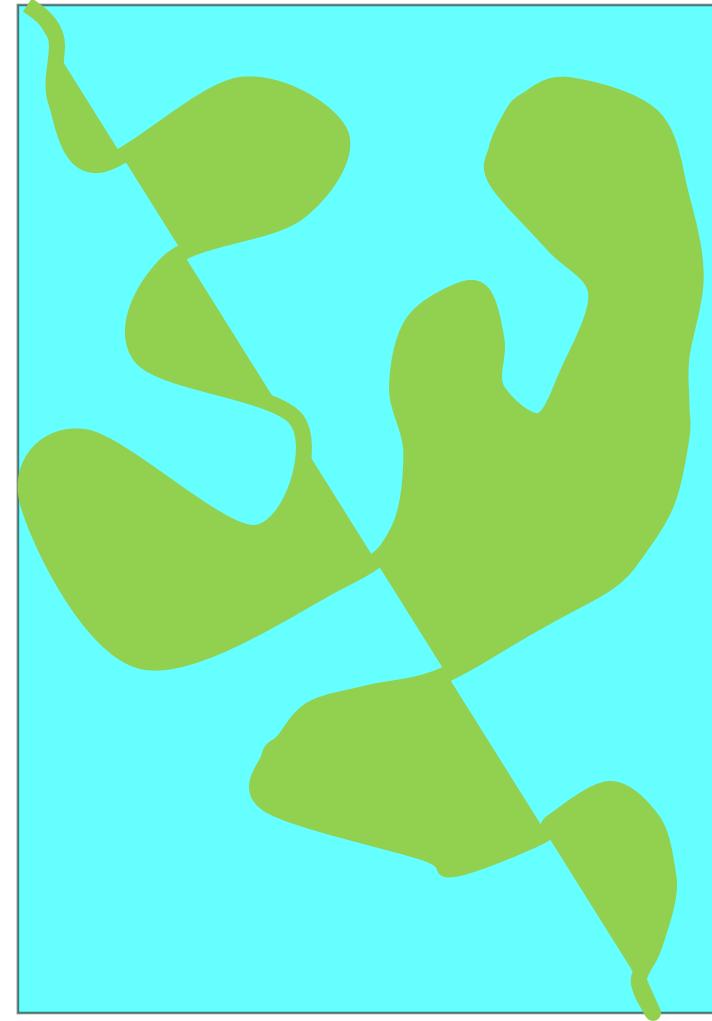
Important Characteristics for Waterfowl

- about 50:50 open water:vegetation cover - “hemimarsh” condition
- need nutrients, mostly P and N, for plant growth and food
- water depths, around 0.5 - 1 m

Hemi-marsh condition



50:50

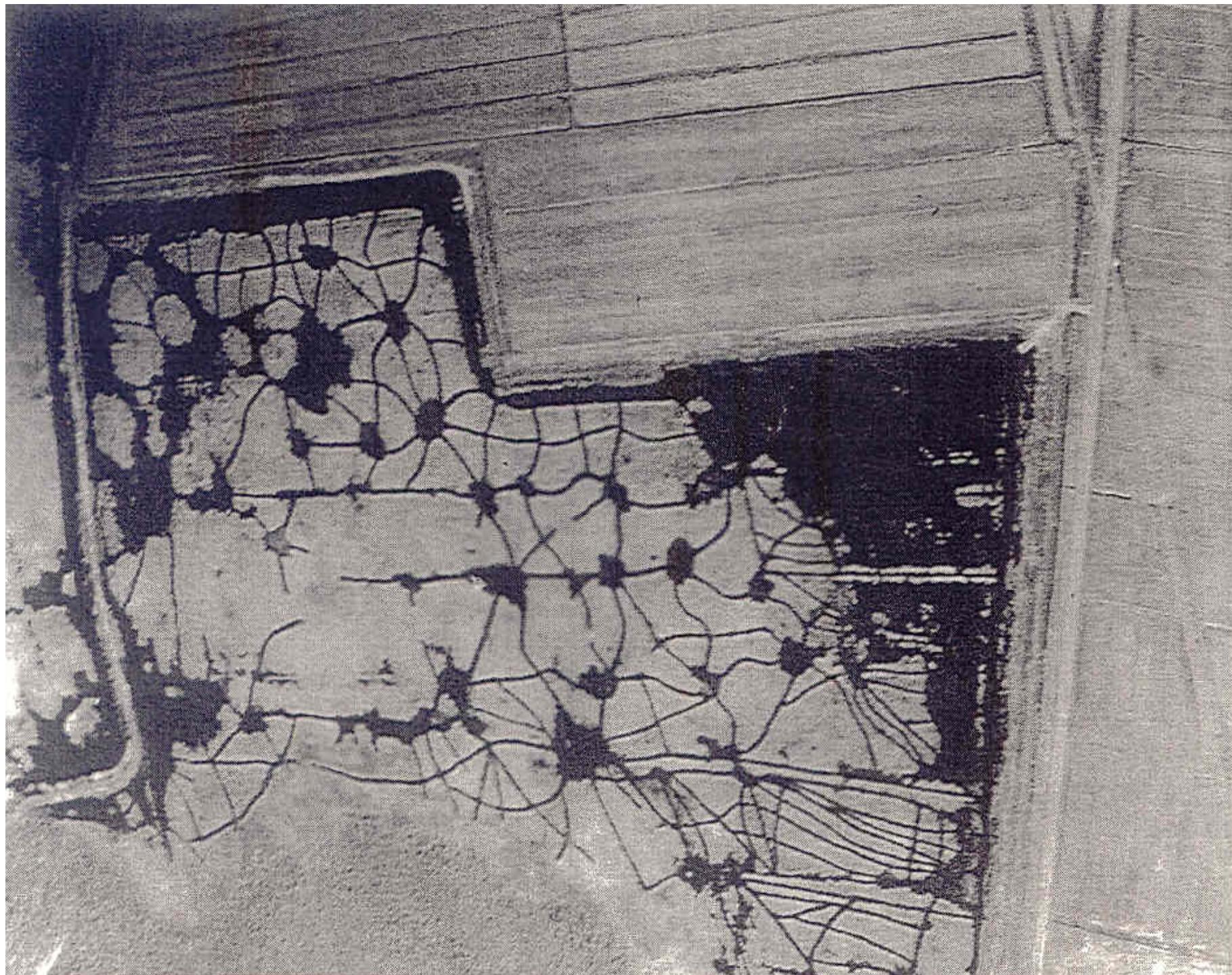


50:50





(Courtesy: NY Times)



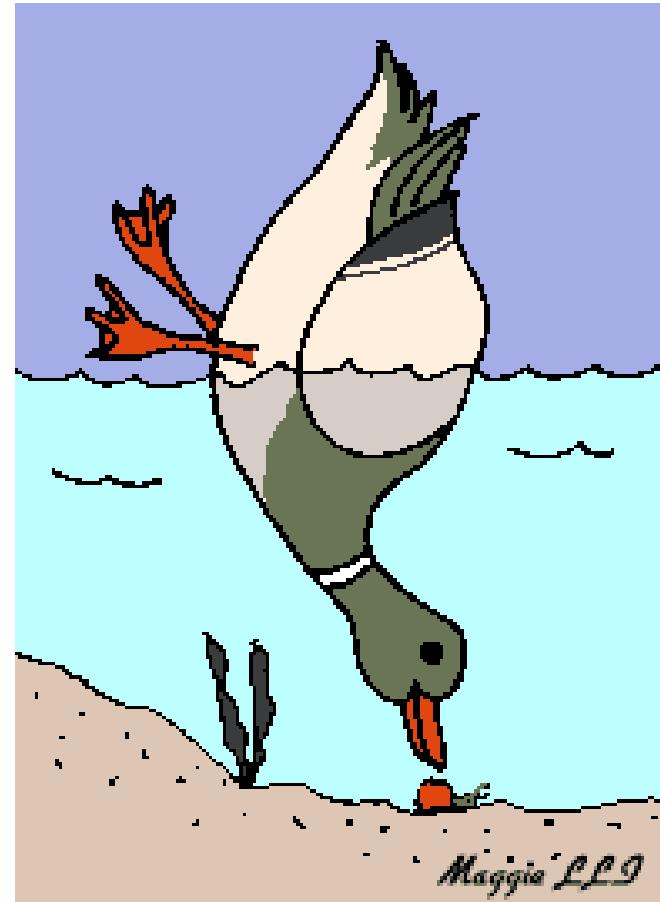
Management

- Too much water: more open water than needed, coloured water, too deep for tipping ducks
- Too little water: building dams with careful planning and design, construction permits; excavate ponds, ditching



Mallard duck

(From: <http://tailsofbirding.blogspot.com/2009/03/more-on-wild-duck.html>)



(From: www.kiddyhouse.com)



Female Wood duck

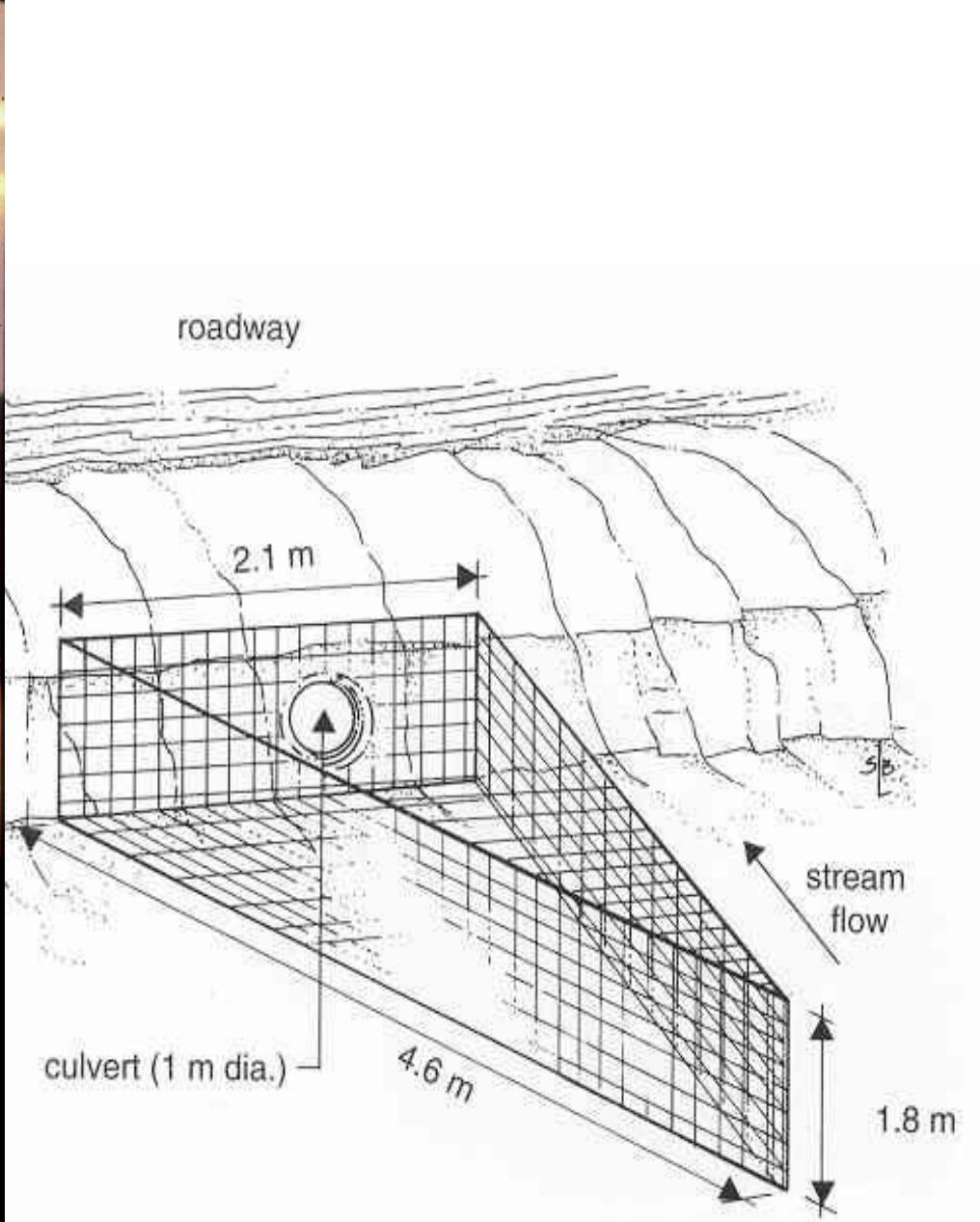
(From Flickr)

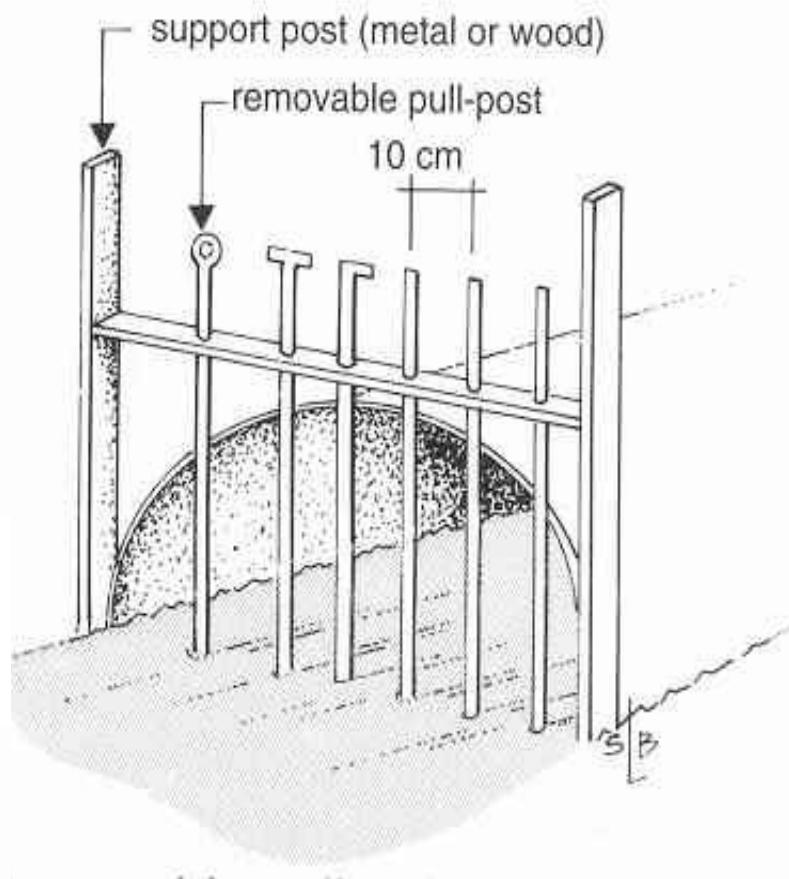
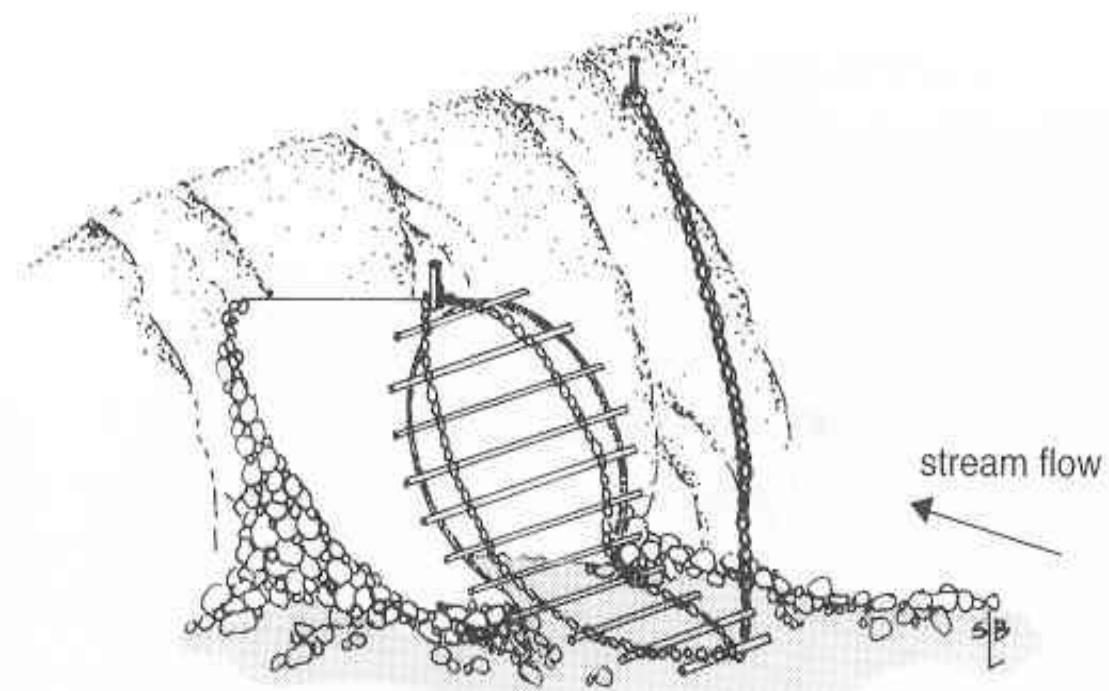
Wood duck nest box

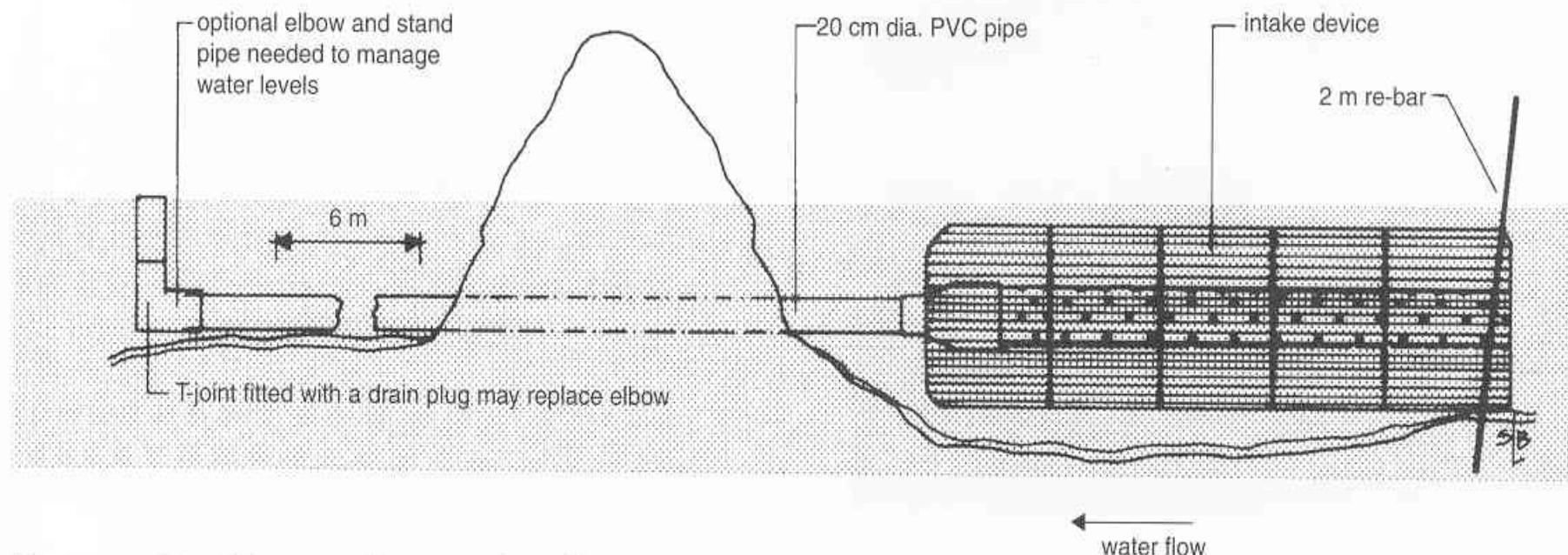
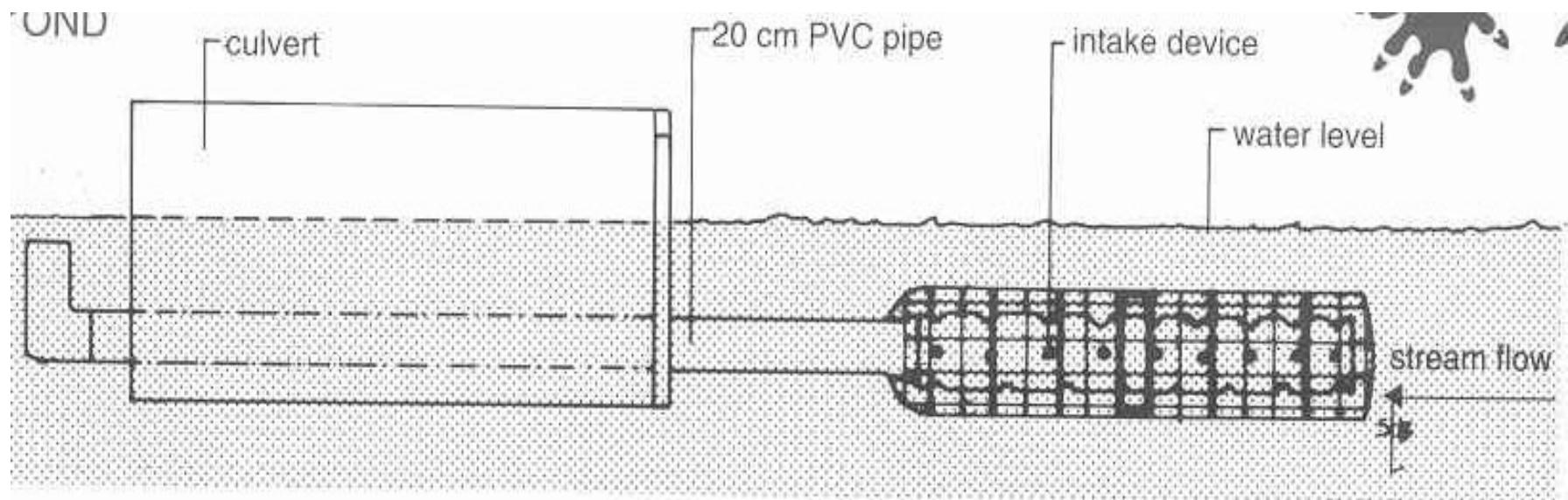


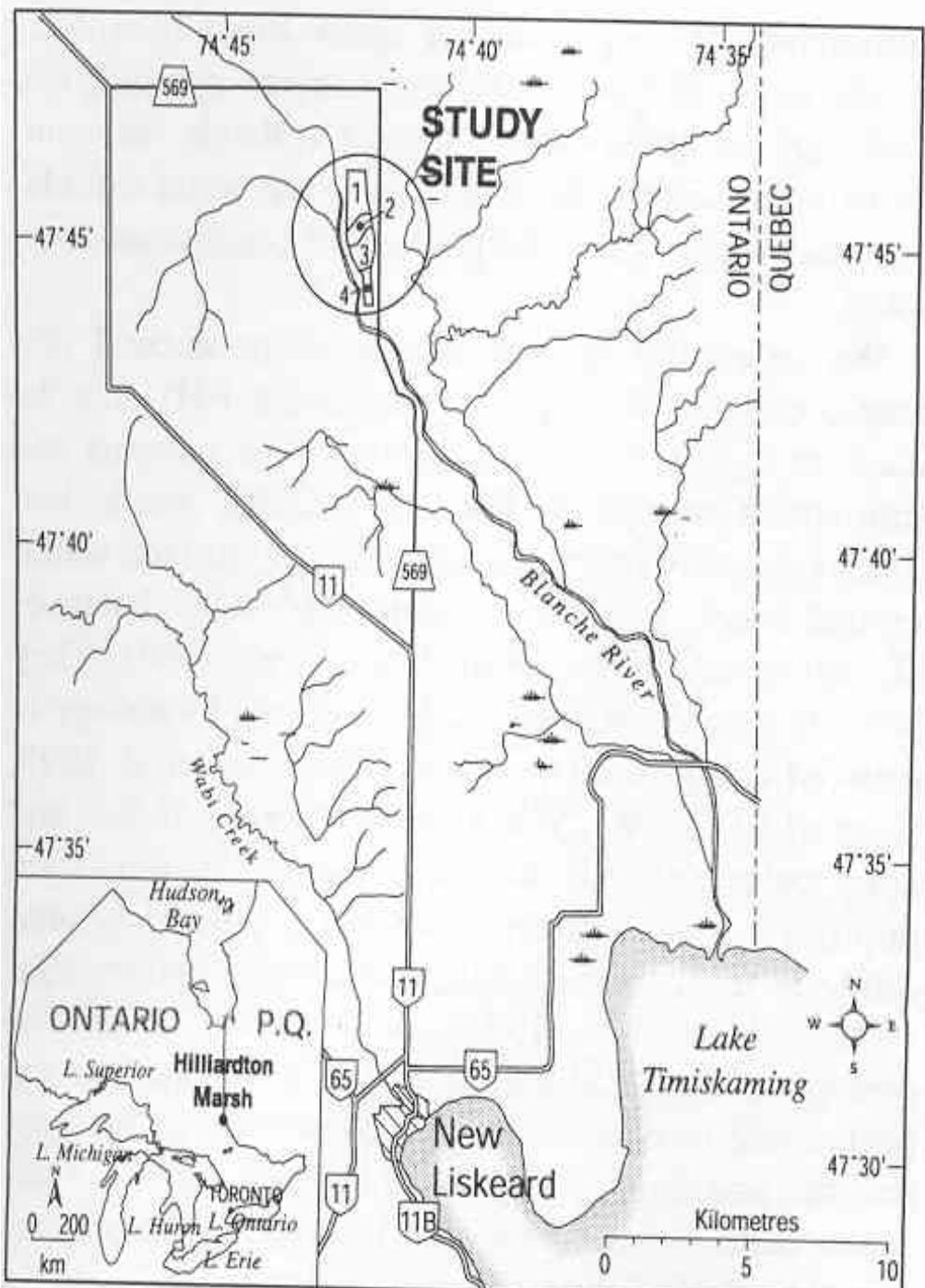
Management

- Low nutrients: agriculture increases nutrients, fertilization of low nutrient sites, due to prolonged flooding-drawdown
- Disturbance: surrounding landscape; water, food and cover - hemimarsh, other animals (ie. muskrats, beavers), wild rice planting, nest boxes















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