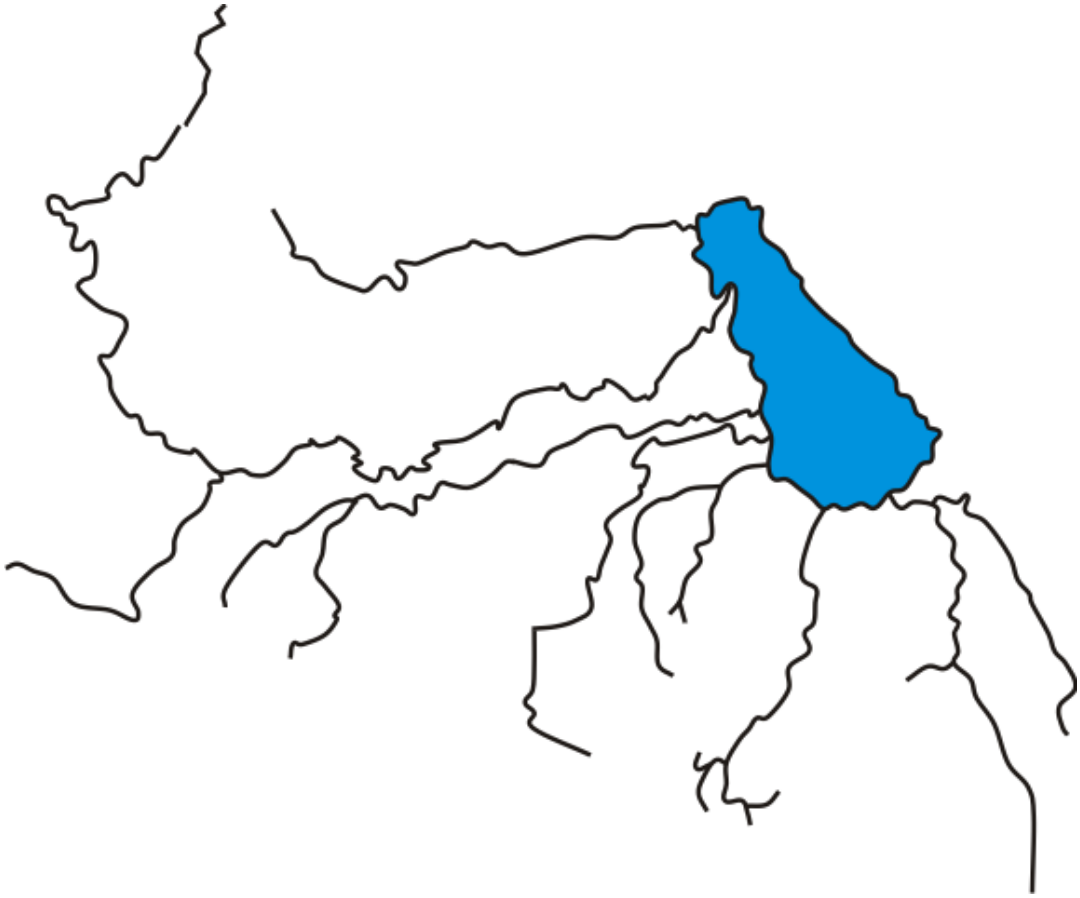
Dauphin Lake Fishery

Status of Walleye Stocks and Conservation Measures



Date: December, 2010

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Background:

Walleye stocks in Dauphin Lake were collapsed by commercial over-harvest and habitat degradation by the 1960s. Walleye stocks were rehabilitated during the 1980s and early 1990s through a combination of reduced commercial allocation and improvements to spawning habitat.

However, concerns over sustainable fishing practices prompted Manitoba Conservation (MC), Water Stewardship (WS), and West Region Tribal Council (WRTC) to develop and sign a Memorandum of Understanding in 2000 to establish a co-management working group to create a Dauphin Lake Management Plan. A WRTC Resource Management Office was also established in Dauphin on a cost-shared basis with WRTC, Indian and Northern Affairs Canada (INAC) and MC.

Since that time, the following conservation measures have been introduced to allow all users of the Dauphin Lake fisheries resource to contribute to efforts to rehabilitate stocks on the lake:

- Commercial:
  - In 2003, the commercial net fishing individual quotas were reduced from 750 lbs to 500 lbs of walleye.
  - Reallocation of commercial fishing licences on Dauphin Lake to WRTC through a voluntary buy-back program for up to 50% of the 30 commercial licences on the lake. To date, 10 licences have been purchased and reallocated.

- Recreational:
  - The reduction of angler limits in 1999 from 6 to 4 walleye.
  - Introduced the “no harvest” slot limit on walleye between 45 cm and 70 cm.
  - The completion of a creel census to determine the recreational harvest after reducing the limit and the introduction of the slot limit.

- Conservation Closure:
  - Prohibiting the harvest of all spawning sized walleye between 45 cm and 70 cm (18 in and 28 in) without a permit at all times and prohibiting all harvest of walleye on all tributaries and within one km of their mouth on Dauphin Lake during the spring spawning period.
  - At all times of the year First Nations people are still allowed to gillnet on the lake proper for sustenance with a free General Fishing Permit from the MC District office in Dauphin. The permits are issued on the basis of one net/one night/one household.
  - In the spring of 2003 the co-management working group reached a consensus to allow harvest of walleye by angling only by First Nations during the spawning closures on tributaries under authority of a General Fishing Permit.
  - During the period from April 15th to April 30th, 2007 First Nations users were asked to abstain from harvesting walleye on the tributaries of Dauphin Lake for the purposes of ensuring good management and sustainability of the stocks for future users. WRTC

Elders monitored harvest, talked to First Nations fishers about the importance of protecting spawning walleye for future generations, and posted signage asking for voluntary restraint on harvest of pre-spawn walleye.

- In 2008, WRTC elders, WS and MC developed and implemented a spring spawning season trap net pilot project. The trap net was set at the mouth of the Turtle River and was intended to capture only post-spawn fish, while building capacity within First Nations to assist with resource management. The trap net was operated and information on harvest collected by WRTC members with assistance from MC and WS staff. First Nations were allowed to collect fish from the trap. The pilot project also encouraged exchanges between observers and users about the trap net method, the state of the fishery and the needs of fishers.
- In spring 2009, based on 2008 fish stock monitoring program results and after consultations with First Nations and Métis peoples regarding concerns over the long-term sustainability of walleye stocks, Manitoba implemented a conservation closure on the Turtle and Valley rivers, and applied additional measures (limits) on other tributary streams.
    - Manitoba recognized that this measure may impact on the amount of food that First Nations and Métis communities may be able to access during this period of the year. As an accommodation measure, Manitoba provided in fillet form the equivalent of 6 walleye / person / day to people on-site who would otherwise be fishing at the Turtle and Valley rivers during the closure.
- In spring 2010, based on 2009 fish stock monitoring program results that showed that the 2001 walleye year class still remained the dominant year class (and a limited number of four to six year old fish - prime spawners - remained in the population), Manitoba again implemented a conservation closure on the Turtle, Valley and Vermilion rivers, and applied additional measures (limits) on other tributary streams. The addition of the Vermilion River was to support monitoring efforts at the newly constructed fishway at Ryz crossing.
    - Manitoba recognized that this measure may impact on the amount of food that First Nations and Métis communities may be able to access during this period of the year. As an accommodation measure, Manitoba provided walleye fillets to people on-site who would otherwise be fishing at the Turtle and Valley rivers during the closure.
- The draft *Dauphin Lake Resource Management Plan* has not been finalized. A Dauphin Lake Management Plan has been drafted with the overall objective of ensuring the long-term sustainability of the fisheries resources of Dauphin Lake with particular emphasis on walleye stocks, while providing benefits to all resource users and accommodating treaty fishing rights. However, the draft plan continues to undergo revisions and has not yet been signed off by WRTC and the Province. This is primarily due to differences over management approaches for the spring domestic fishery and the appropriate level of funding for the WRTC Resource Management Office.

Estimated Harvest:

These preliminary population estimates from literature models based on water chemistry, lake morphometry, and historical fish production determines the annual walleye yield on Dauphin Lake that could be up to 100,000 lbs. This estimate of harvest potential is refined by

production history with adjustments based on analysis of index netting and seining results to assess year class strengths, survival rates and recruitment potential.

In general, walleye harvest has been reduced under conservation measures established for all users of the Dauphin Lake walleye resource. Estimated walleye harvest from Dauphin Lake by all users is shown in table 1. Estimated annual domestic walleye harvest by season is shown in table 2.

Table 1: Estimated walleye harvest by all users from Dauphin Lake.

Estimated Harvest (lbs)				
Year	**Commercial**	**Recreational**	**Domestic***	**Total**
2000	13,900	25,000	69,000	107,900
2001	20,400	25,000	155,000	200,400
2002	10,700	25,000	3,450	39,150
2003	13,000	25,000	8,700	46,700
2004	11,900	25,000	16,397**	53,297**
2005	11,450	17,900****	46,600	79,950
2006	9,750	17,900	15,792	43,442
2007	9,750	17,900	22,688	50,038
2008	8,550	17,900	17,864	44,314
2009	9,900	6,300****	8,078	24,278
2010	N/A	6,300	1,740***	N/A

* Includes spring/summer & winter
** Does not include 25,000 lbs of non-permitted nets
*** Spring only
**** 2005 and 2009 creel surveys conducted. Other years are estimates.

Table 2: Estimated domestic walleye harvest from Dauphin Lake.

Estimated Domestic Harvest (lbs)			
Year	**Spring**	**Summer/Winter**	**Total**
2000	59,998	8,800	69,000
2001	4,998	149,993	155,000
2002	1,199	2,248	3,450
2003	1,199	7,499	8,700
2004	4,099	12,298	16,397*
2005	37,699	8,899	46,600
2006	7,262	8,529	15,792
2007	19,549	3,138	22,688
2008	11,044	6,820	17,864
2009	3,309	4,778	8,078
2010	1,740	N/A	N/A

* Does not include 25,000 lbs of non-permitted nets

Stock Assessment:

WS conducts annual index netting and sampling of commercially caught fish to assess the status of walleye stocks. Dauphin Lake results are as follows (red bars indicate 2001 year class and yellow bars indicate 1997 year class).

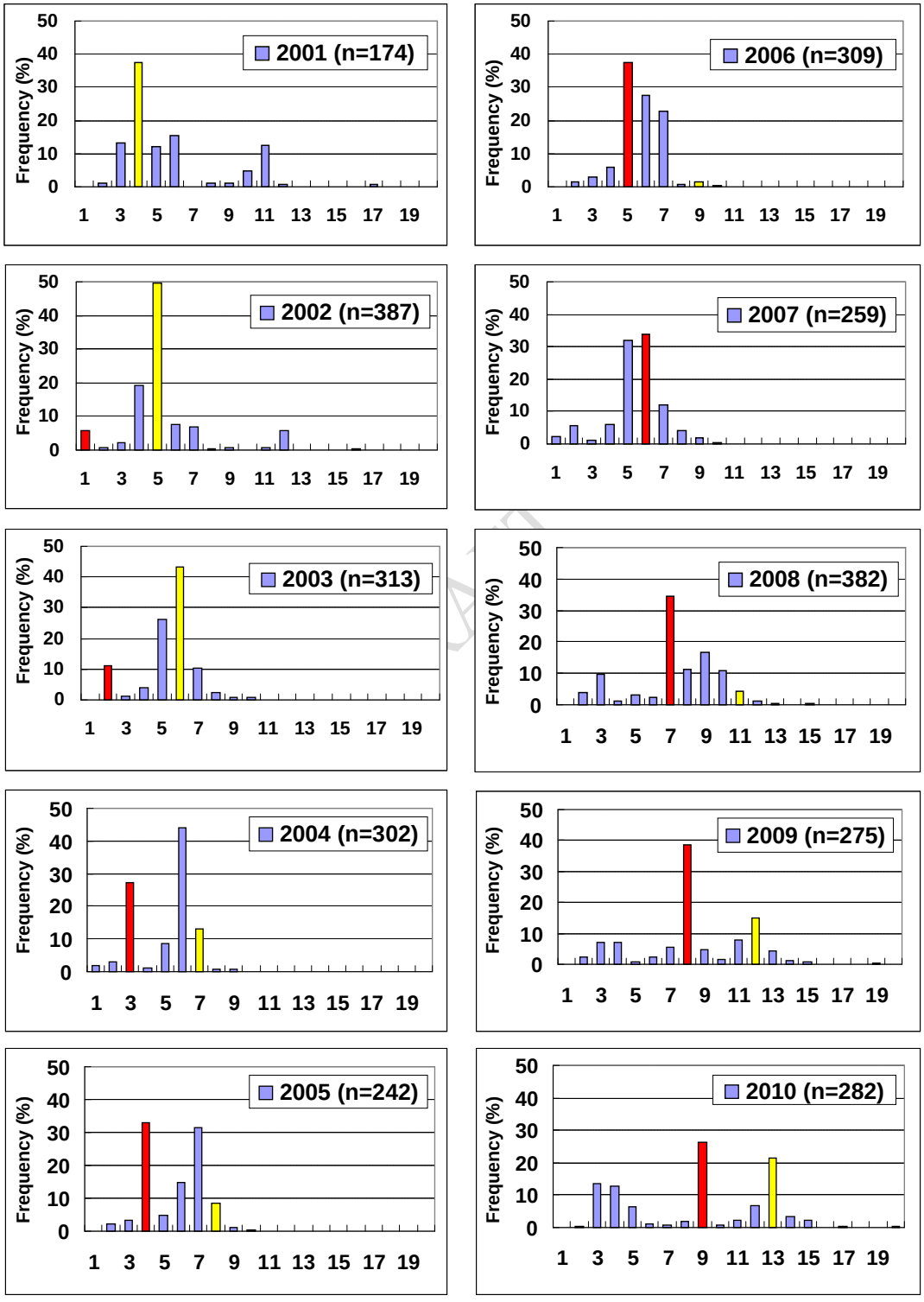

Figure 1: Age composition of walleye from index gill net surveys from 2001 to 2010.

Figure 1 shows the age composition of walleye stocks from 2001 to 2010. The 2001 year class still remains a significant year class in the population, however the percentage of 4 year old fish and younger showed a slight increase in 2010. There were a limited number of six to eight year old fish caught in index gill nets. The spring closure in 2010 helped protect spawning fish from dominant year classes (9 and 13 year old fish). The presence of three or more year classes that each contributed at least 15% to the sample is considered to be one indicator of a relatively stable fish stock. From 2007 to 2010, only two year classes (older) made up at least 15% of catch.

Seining results from 2008 to 2010 indicated the presence of young-of-the-year walleye at several sites. This preliminary information provides data to allow for additional trend over time analyses in conjunction with other stock monitoring activities.

Age composition results of walleye caught during the 2009/10 winter commercial fishery (*Figure 2*) indicated that a greater percentage of the catch were 3 year old fish (2006 year class). Although a larger number of 3 year old fish were sampled from the commercial catch, fish of this age are not typically caught in the commercial fishery because larger mesh (4 inch) is used. When compared to previous years, the percentage of 3 year old fish sampled from the commercial catch was not consistent. In addition, there were no indications prior to 2010 that a strong 3 year old year class was entering the population. The mean (average) age of the commercial catch in 2009/10 was 5.5 years old, which is similar to previous years.

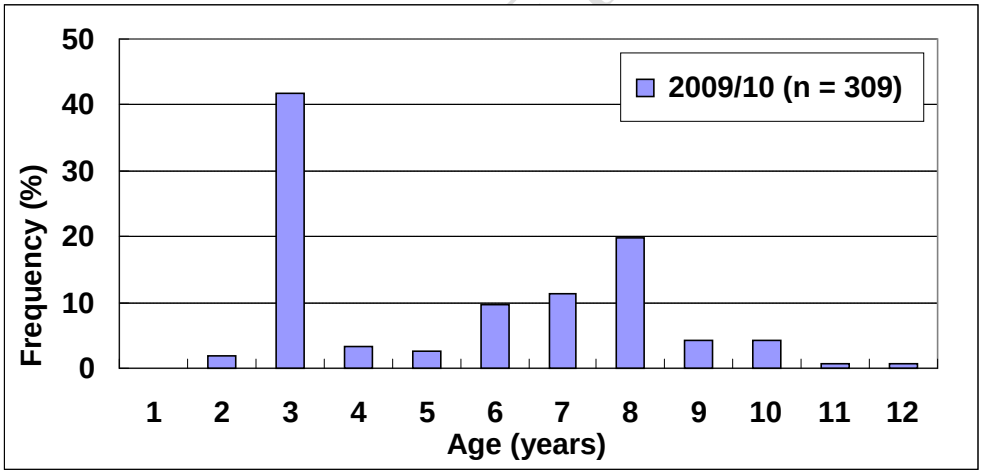

Figure 2: Age composition of walleye sampled from the 2009/10 winter commercial fishery

Environmental factors, such as spring stream flows and uniform warming rates, can have a measurable effect on walleye spawning success. Annual spring flow rates for key spawning streams reflect a pattern with spawning success. The average monthly stream flows for April in the Turtle and Valley rivers were below normal (the 20-year average) in 2002 and 2003 (*Figures 3 and 4*). The average stream flows over the last two weeks in April (typical when walleye spawn) show levels were below normal from 2002 to 2005. These years of low flows during key spawning times are reflected in the weak walleye year classes over the same period.

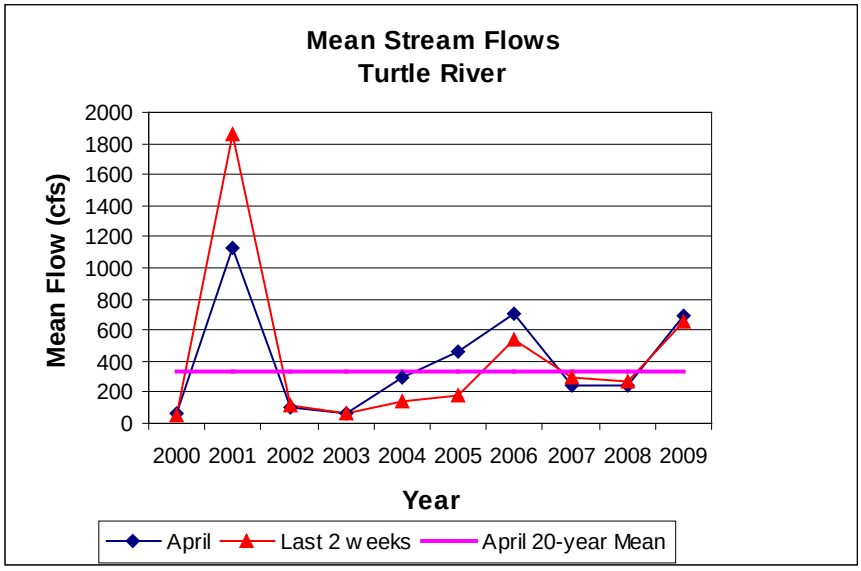

Figure 3: Mean spring stream flows in Turtle River 2000-2009.

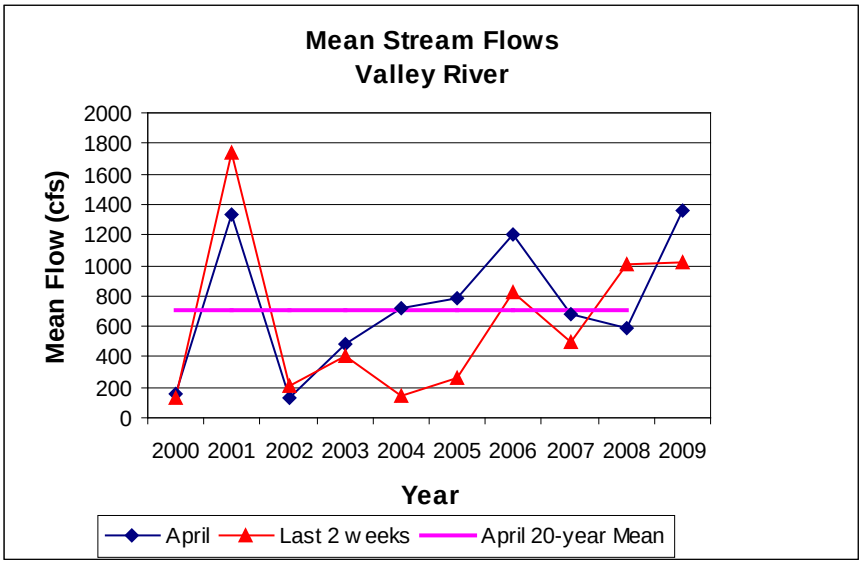

Figure 4: Mean spring stream flows in Valley River 2000-2009.

Results from the 2010 annual stock monitoring program also indicated that the mean age of walleye increased to nearly 9 years old (*Figure 5*). This was partly due to the large proportion of the catch that was part of the strong 2001 year class. An increase in mean age can be an indicator of an aging population with fewer younger fish.

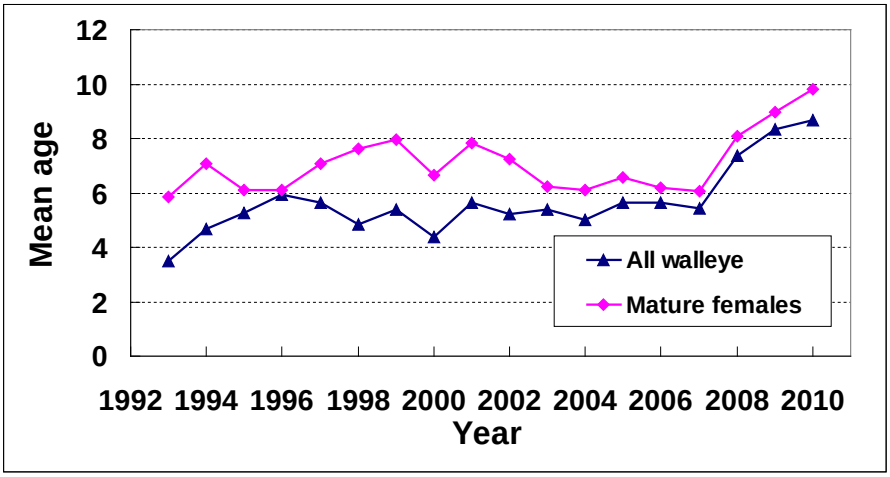

Figure 5: Mean age of walleye (sexes combined and mature females only) from 1993 to 2010.

Relative abundance of all walleye from index netting, by weight, increased after 2005 and decreased in the last two years (*Figure 6*).

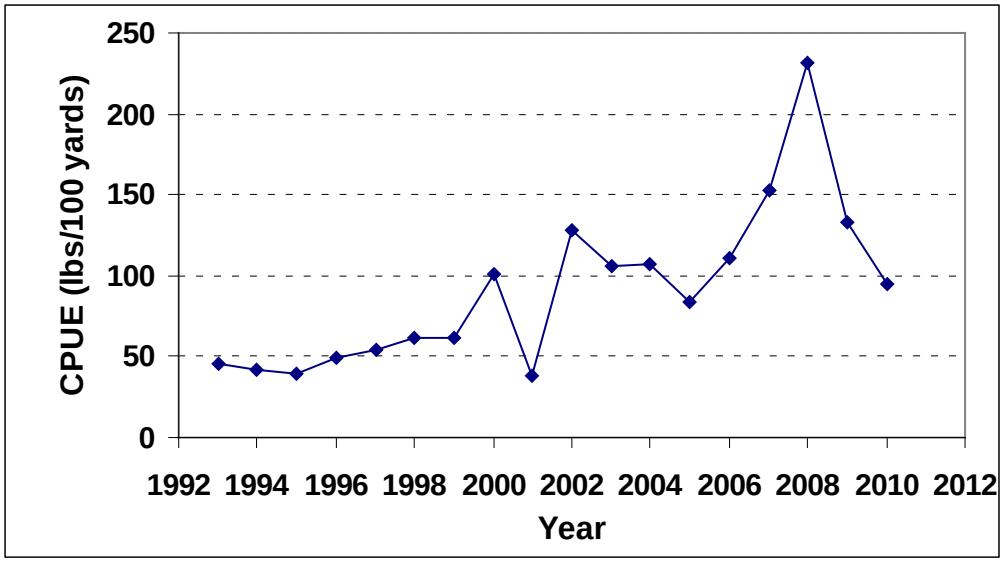

Figure 6: Catch-per-unit-effort of all walleye caught during annual monitoring in June, 1993 to 2010.

Biologically, mature female fish are considered to be more critical than mature male fish for the production of future year classes of fish. Similar to trends seen in relative abundance of all Walleye (above), relative abundance of mature female walleye in the catch increased after 2005 (possibly due to the slot limit imposed on anglers in 2002 to protect larger older spawners). However, index netting results from 2010 show decreased relative abundance of mature female walleye, suggesting these older fish have begun to move out of the population (*Figure 7*). There appears to be fewer young fish to replace them, based on the apparent decline in relative abundance of immature females since 2002.

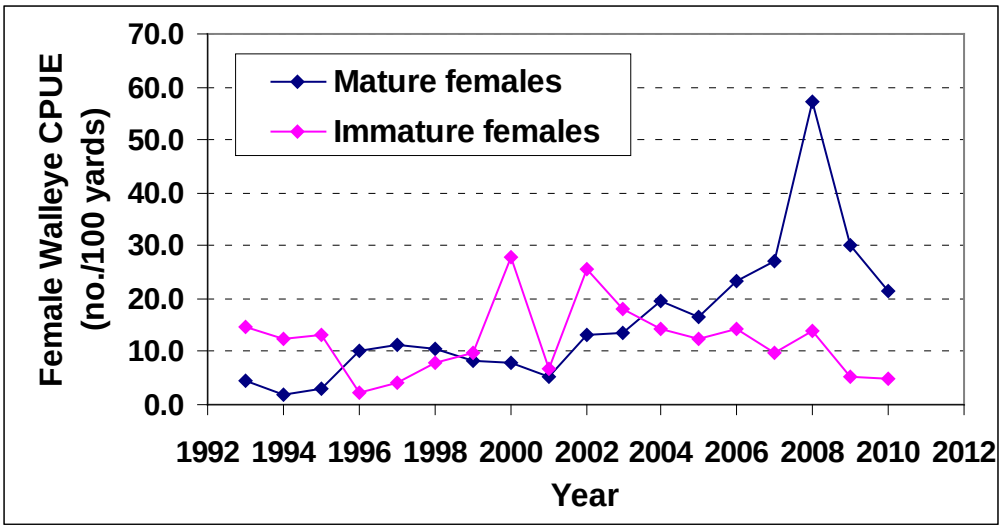

Figure 7: Catch-per-unit-effort of mature and immature female walleye caught during annual monitoring in June, 1993 to 2010.

The age-at-maturity of all walleye decreased after 2006 and increased slightly in 2010 (*Figure 8*). Generally, a decrease in age-at-maturity is also an indicator of fewer younger fish. Reduced numbers mean less competition for food, and therefore more food available per individual, which in turns allows faster growth, resulting in fish maturing at a younger age.

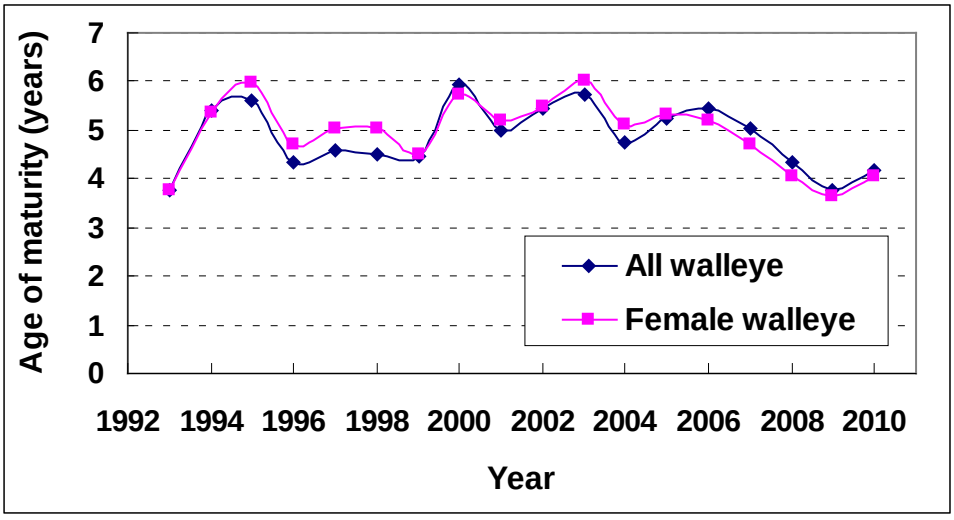

Figure 8: Age of maturity of walleye (sexes combined and females only) from annual monitoring in Dauphin Lake, 1993 to 2010.

Resource Management Implications:

While the walleye population in the lake appeared to have been relatively stable during the early 2000s, stock assessment data began to show evidence of weak recruitment into the fishery during the mid-to-late 2000s. Results during this period indicated that the fishery was relying on the 2001 year class to sustain stocks that resulted in additional conservation measures being implemented in the springs of 2009 and 2010.

Although there are still concerns regarding long-term recruitment into the fishery, 2010 stocking monitoring results showed signs of enhanced walleye recruitment into the fishery (i.e., stronger 3 and 4 year old year classes).

Fishing during a spawning run can have an impact on recruitment. Average fecundity for Manitoba walleye is approximately 22,500 eggs per pound of female. Thus, harvest of a large female walleye before it has spawned represents potential loss of a significant number of fish, even if environmental conditions are bad and spawning success is low (survival rate from the egg stage to adult walleye can be as low as 1% in poor years).

First Nations elders recognize and have expressed concern over this potential loss of fish that would negatively affect future generations of all users who may depend on this resource. It also must be noted that even if spawning walleye receive greater protection, environmental conditions are not always favorable to recruitment success. Therefore it is important that sufficient spawning stocks are maintained to take advantage of favourable environmental conditions when they are available and enhance recruitment to the fishery.

The commercial catch is taken in the winter and due to restrictions of allowable mesh size, harvest generally captures fish greater than 40 cm in length (i.e., larger, older fish). Commercial walleye quotas and harvest are very low compared to other users of the resource. The commercial fishery also offers some benefits to walleye populations in that other species are harvested, that may be predators on, or competitors for food with walleye. Some species, such as carp, can also be very destructive to walleye habitat. *Figure 9* shows the species harvested from Dauphin Lake by the commercial fishery.

Slot size for angling on Dauphin Lake prohibits harvest of walleye between 45 cm and 70 cm in length. Anglers are restricted from fishing during spring spawning, and the slot limit prevents them from harvesting the larger fish which are available to the domestic and commercial fisheries.

In addition, low flows combined with spring harvest from 2002 to 2005 impacted recruitment as evidenced by the lack of strong year classes since 2001, which suggests that further protection may be needed of spawning walleye.

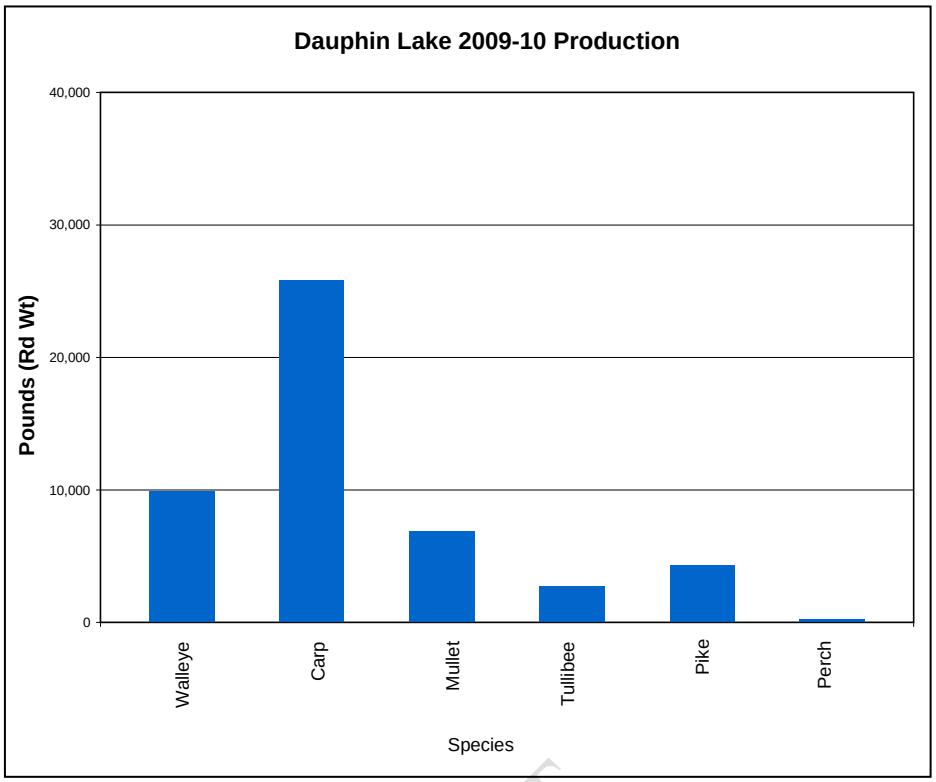

Figure 9: Dauphin Lake commercial fishery production 2009-10.

Conclusions:

1. Stock Status

There are a number of indicators that are used to determine the status and health of fish stocks in provincial waters. These include, but not restricted to, age structure (i.e., variation in year class strength), mean age of catch, age of maturity, and catch per unit effort.

- Based on 2010 index netting results, the 2001 year class remained a significant portion of the population. There was a slight increase in the percentage of three and four year old fish in the population.
  - The presence of three or more year classes that each contributed at least 15% to the sample is considered to be one indicator of a relatively stable fish stock. In 2007 to 2010, only two year classes (older) made up at least 15% of catch.
- Since 2007, the mean age of walleye has increased to approximately 9 years old. This is reflective of the strong 2001 year class that has been predominant in the population. Increasing mean age is an indicator that the population is aging with fewer younger fish.
- Since 2004, the overall age of maturity has shown a steady decline. A decrease in age of maturity is also an indicator of fewer younger fish in the population and a population response to this decline in abundance.
- Catch per unit effort (CPUE) results showed a decrease in relative abundance of mature and immature females in the walleye population. This is of concern because limited recruitment

opportunities will affect the long-term sustainability of the fishery. A stable or increasing CPUE suggests that the population is relatively stable or expanding while a decreasing CPUE suggests that the stock is declining.

Based on results from the 2010 stock monitoring program, there still remains a concern that recruitment opportunities may be limited.

2. Harvest

Estimated harvest by all resource users is an additional measurement to determine fish stock pressure and assists in determining relative abundance. Harvest levels, in combination with biological indicators, provide fisheries managers with information to assist in the overall assessment of stocks.

- In recent years, the overall walleye harvest in Dauphin Lake has shown a decline.
- The commercial walleye catch has remained relatively stable at 9,500 kg.
- Results from the 2009 creel census survey showed a decline in the harvest rate in comparison to results from the 2005 creel census survey.
- Estimated domestic walleye harvest has also declined during this period.

The overall decline in walleye harvest has been the result of conservation measures established for all users of the Dauphin Lake walleye fishery. The reduced harvest level supports efforts in enhancing recruitment opportunities into the fishery.

3. Enhanced monitoring

To ensure accurate and up-to-date information is collected, WS will continue to develop approaches to enhance monitoring activities.

- The Department will undertake annual stock monitoring activities on Dauphin Lake and explore opportunities to enhance assessment efforts.
- Age composition results of walleye caught during the 2009/10 winter commercial fishery indicated that a greater percentage of the catch were 3 year old fish (2006 year class). In comparison to previous years, fish of this age are not typically predominant in commercial catches. The department will enhance the commercial sampling program to improve understanding of characteristics of the commercial fishery.

WS will work in cooperation with the West Region Tribal Council, First Nation peoples, Métis harvesters, recreational anglers, and commercial fishers in the Dauphin Lake area to protect and conserve walleye stocks for the benefit of future generations. This will include strengthening working relationships and building capacities with resource users and exploring adaptive management approaches to ensure the long-term sustainability of the Dauphin Lake fisheries resource.